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ENERGY MINES AND RESOURCES CANADA

CANMET, NATIONAL URANIUM TAILINGS PROGRAM

A REPORT ON THE COLLECTION OF DATA RELEVANT TO THE CANADIAN NATIONAL URANIUM TAILINGS PROGRAM

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Systemhouse Ltd.
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1. EXECUTIVE SUMMARY

In December of 1983, Systemhouse Ltd. was awarded a contract to collect data relevant to the Canadian National Uranium Tailings Program and to convert it into a machine readable format.

Since the identification, collection and verification of this data required highly specialized expertise, subcontracts were awarded to Golder Associates and SENES Consultants Ltd. Both of these companies had several years experience and involvement in studies concerning uranium tailings and were both highly qualified to carry out this aspect of the work.

As the prime contractor, Systemhouse Ltd. was responsible for all project deliverables. In addition to the project management activities, Systemhouse Ltd. designed the data transcription forms, designed and developed the computer software and user aids to produce the verification reports and co-ordinated the procurement of supplies and data entry services.

The work was carried out in four phases, namely, data identification, data collection, data transcription/ conversion and data verification. The main priority was to identify as much relevant data as possible. The identified data was priorized against a predefined criteria established in conjunction with the project scientific authority.

The data was collected and converted to machine-readable media, with the data considered the most relevant to the National Uranium Tailings Program collected and transcribed first. This process continued until all budgets were exhausted.

As a quality assurance measure, reports of the machine readable data were produced and verified against the raw study data. Any discrepancies in the data were noted and corrections made and re-verified.

A breakdown of the costs associated with each stage is provided in Figure 1.1. A summary of the number of reports at each stage of the process is provided in Figure 1.2., and the number of samples and boreholes converted to machine readable media is presented in Figure 1.3.

	Data Ident'n	Data Coll'n	Data Conv'n	Data Verif'n	Report Prepar'n	Totals
SHL****	6	2	21*	13**	6	48
SENES	14	10	0	2	2	28
GOLDER	9	2***	5	1	0	17
TOTAL	29	14	26	16	8	93

Figure 1.1 Distribution of Project Dollars (000's)

* Includes:
- Design data capture forms (approximately $5,000.00).
- Data Entry Costs (approximately $3,000.00).
- Transcription Form Supplies (approximately $1,000.00).
- Systemhouse Ltd. transcribed the data collected by SENES

** Includes one time non recurring cost to design and develop verification report software. Also includes error correction.

*** GOLDER did not have a substantial data collection effort because studies identified for conversion did reside in their own library.

**** Figures include Project Management and Travel and Living costs.

	Studies Identified	Public Studies Identified	Studies Not Released	Studies Collected	Studies Converted to Machine Readable Media
SENES	88	88	0	48	15
GOLDER	340	95	245	45	4
TOTAL	428	183	245	93	19

Figure 1.2 Distribution of Project Studies

Study No.	No. of Samples	No. of Boreholes
1	201	
2	309	
3	90	
4	1055	
5	21	
6	22	
7	59	
8	221	
9	83	
10	76	
11	77	
12		22
13		13
14		6
15		37
16	21	
17	73	
18	44	
19	46	
Totals	2398	78

Figure 1.3 Number of Samples/Boreholes converted to machine readable media.

2. INTRODUCTION

Late in 1979 the Canada Center for Mineral and Energy Technology (CANMET) organized a meeting attended by organizations involved in sponsoring or performing uranium tailings research. The organizations which participated were the mining companies that produce the tailings, the federal government departments that set regulations and standards and enforce them, and various other groups such as provincial research organizations, universities and private sector consultants. This was a first step toward the establishment of a comprehensive and integrated federal program which resulted in the formation of the National Technical Planning Group on Uranium Tailings Research, sponsored by CANMET. The mandate of this group was to propose a research program structure, establish a program schedule, and to propose a program management structure.

This end was achieved and the group published their report in September of 1981. This report recommended the establishment of a Uranium Tailings Data Base to support the proposed Modelling Program.

In March of 1982, Systemhouse Ltd. prepared a preliminary design for the organization and content of a database for uranium tailings data. The study and preliminary design was limited in scope to the tailings containment facility and its content, and was an attempt to anticipate the requirements of the then proposed National Uranium Tailing Program. The report contained recommendations on both the implementation and the usage of the data and database.

Later in 1982, the National Uranium Tailings Program (NUTP) received Cabinet approval and was announced to the Canadian public. A contract was let to Systemhouse Ltd. for the development and generation of a prototype Uranium Tailings Data Base. This was completed in mid 1983 and a workshop to demonstrate the CANUT data base was held June 24 and 25, 1983. At this time, the database contained data from Environment Canada and the University of Toronto. A further contract was let to include data from Rio Algom, the Ontario Ministry of the Environment and Saskachewan Ministry of Environment. At the end of February, 1984, the database contained 7,707 samples and 115,995 measurement results.

In January, 1984, Systemhouse was awarded a contract to collect data relevant to the National Uranium Tailings Program for entry into the Canadian National Uranium Tailings Computer Database. Concurrently, various other contracts were let to consulting companies to develop predictive models as part of the NUTP modelling program. The main objective of the data collection contract was to support the development and refinement of mathematical predictive models.

The purpose of this report is to describe the work performed under the data collection contract. The work has been categorized into four main objectives as follows:

- Data Source Identification
- Data Collection
- Data Conversion
- Data Verification

Each category or objective is covered in a separate section in this report. Any deliverable items resulting from the work carried out under the data collection contract have been included in this report as an attachment.

As the prime contractor, Systemhouse Ltd. was responsible for project management and delivery of all aspects of the contract. However, the delivery team consisted mainly of three companies; Systemhouse Ltd., Senes Consultants Ltd. and Golder Associates. A project organization chart has been provided in figure 2.1 to demonstrate the project team structure. Senes Consultants Ltd. and Golder Associates were awarded subcontracts to aid in the identification, collection and verification of data due to the experience and expertise both companies have in the uranium tailings industry.

NATIONAL URANIUM TAILINGS PROGRAM

DATA COLLECTION PROJECT

ORGANIZATION CHART

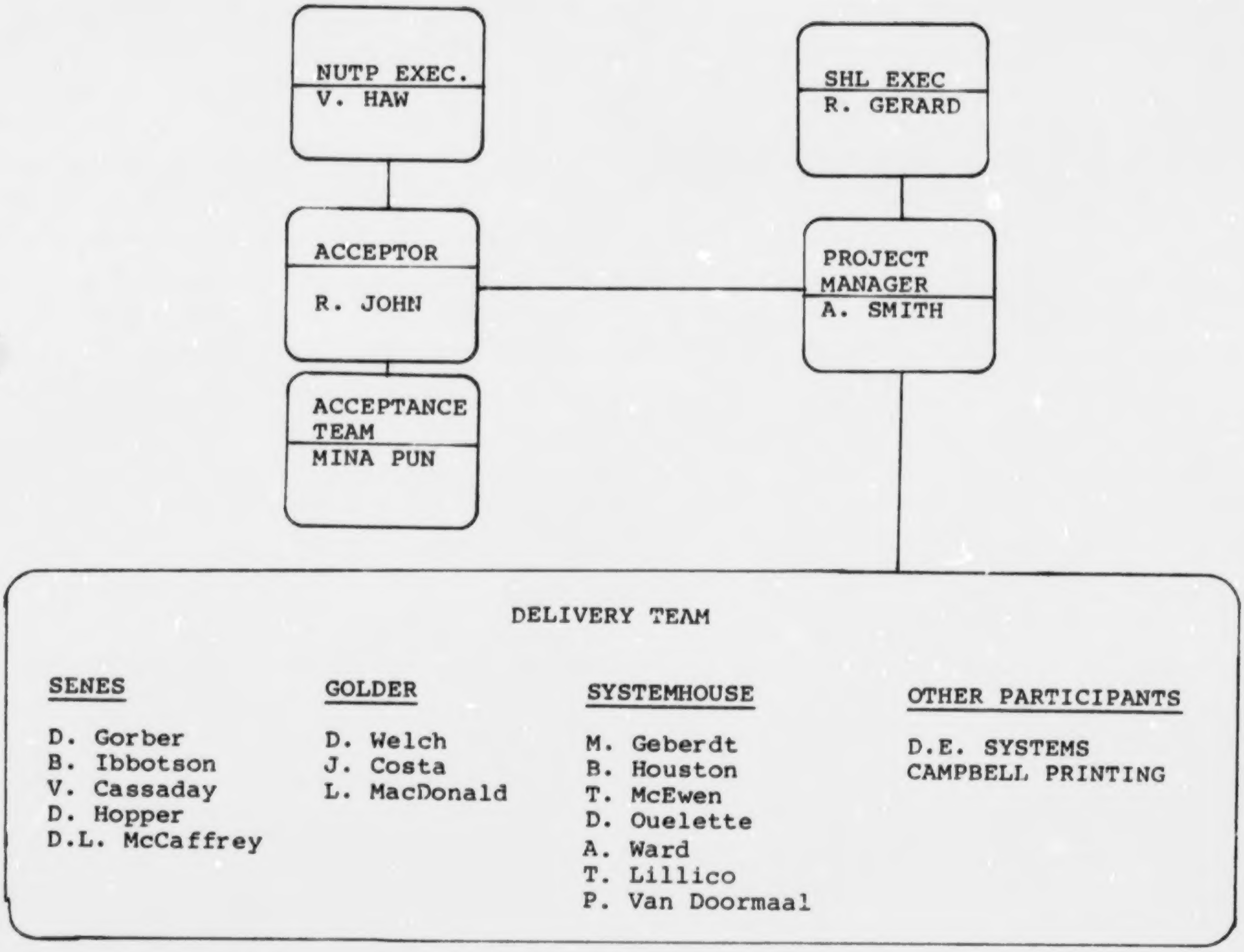
NUTP EXEC.
V. HAW
SHL EXEC
R. GERARD
ACCEPTOR
R. JOHN
PROJECT MANAGER
A. SMITH
ACCEPTANCE TEAM
MINA PUN
DELIVERY TEAM
SENES
D. Gorber
B. Ibbotson
V. Cassaday
D. Hopper
D.L. McCaffrey
GOLDER
D. Welch
J. Costa
L. MacDonald
SYSTEMHOUSE
M. Geberdt
B. Houston
T. McEwen
D. Ouelette
A. Ward
T. Lillico
P. Van Doormaal
OTHER PARTICIPANTS
D.E. SYSTEMS
CAMPBELL PRINTING

FIGURE 2.1

3. DATA SOURCE IDENTIFICATION

The first phase of the project was the identification of data sources. Work on this phase began January 9, 1984. A meeting was held on January 11, 1984 to establish the terms of reference for the data source identification with respect to the subcontracting companies. The project's scientific authority provided direction and guidelines to be used in the identification phase. These were as follows.

- The major purpose of the database is to provide data which is useful to the modellers.
- At least one site in Ontario and one in Saskatchewan should be included in the study.
- The search for data sources should be limited to mines with tailings, either active or inactive.

On January 18, 1984, Systemhouse Ltd. met with Golder Associates and Senes Consultants Ltd. separately to establish the data input requirements for the identification of sources and to establish a priority (or value indicator) on all sources so identified. The priority indicator was required because the limited contract budget did not allow for the inclusion of all the data from all Canadian uranium tailings areas. Therefore, the project effort concentrated on those categories of data deemed most important.

Golder Associates agreed to list and priorize sources containing geotechnical, hydrogeological and dam data from the Panel site in Ontario and one from Saskatchewan. The priority rating system used by Golder is listed here (in decreasing order).

1. Factual - monitoring, chemical and environmental data
2. Factual - hydrology, hydrogeology, meteorology
3. Design/Antriction - basin, dam, treatment, design criteria
4. Predictive - modelling studies, analyses, impact
5. Factual - soil/rock engineering properties.

Senes Consultants Ltd. agreed to try and identify all useful sources of monitoring, environmental, chemical analyses and treatment data. All the data identified by Senes would be considered to be top priority.

Based on the decisions reached at the January 18, 1984 meeting, a project plan was prepared by Systemhouse Ltd. and delivered to the scientific authority. On January 25, 1984, the scientific authority met with Systemhouse Ltd. The project plan was reviewed and deemed acceptable.

Following project initiation, searches were started of the SENES libraries and files to identify documents that might contain environmental data suitable for the data base. A similar search was undertaken by Golder to identify sources of geotechnical information. These descriptions included bibliographic information and indications of the numbers of sampling locations, types of parameters monitored, and numbers of measurements. Documents were grouped according to the specific tailings area(s) each addressed and a general assessment was made of potential contribution each could make to the data base based upon the quality of useful data it contained.

On February 10, 1984, a meeting was held in the Toronto Branch office of Systemhouse Ltd. with the project scientific authority from EMR and representatives from Systemhouse Ltd. and the two subcontracting Companies (Senes and Golder). The purpose of the meeting was to allow the scientific authority to review the progress of the project to date and to confirm the priority schemes in place.

Upon examination of the sources identified, the project scientific authority concluded that this phase of the project should not continue further as enough sources had been successfully identified.

Senes Consultants identified 88 sources, all of which were public domain documents, while Golder Associates identified 338, 95 of which were public domain documents. The sources were documented on a data source summary document by Senes Consultants Ltd., and in a tabular bibliographic format by Golder Associates. The data source summary documents and bibliography of the sources in the public domain are provided in Attachments B and C respectively. These attachments represent the end deliverable of this phase of the project.

4. DATA COLLECTION

The data collection phase began with the February 10, 1984 decision to stop the data source identification process.

Golder Associates, having identified sources they believed contained both public and non-public information, contacted the companies and agencies sponsoring the reports and requested a verification of the confidentiality designation. This was done in order to avoid potential legal infringements and subsequent litigation proceedings. Most of the reports identified by Golder were already in their possession, either in their Mississauga office or their Saskatchewan Branch. Consequently, much of the data collection effort was spent ensuring the data to be used was public. However, relevant data from 45 studies was collected and sent to Systemhouse, 4 studies of which were sent on the transcription forms designed by Systemhouse to capture the data.

Following data identification, efforts were begun to obtain data not found at SENES but known to be available elsewhere. Also reviewed were the various descriptors for data capture that would be needed for CANUT to identify each piece of data as unique. Knowledge of these descriptors subsequently facilitated the transmission of data between SENES and Systemhouse by taking advantage of SENES familiarity with the documents, the ways in which monitoring programs are conducted, and the ways in which environmental data are presented.

Given that a substantial quantity of information was already in hand and that project resources would not allow all Canadian data to be captured, it was decided to focus on getting as much as possible of the pertinent data already gathered into machine-readable form.

With a better appreciation of the kinds of information that would be most useful to Systemhouse, SENES started a careful review of individual documents and environmental data files. Pages with useful data, maps illustrating sampling locations, and cover pages were copied and assembled to form a condensed version of each document. Brief notes or instructions were frequently written in the copies to clarify data capture. In February, March, April, and June, packages (each containing several condensed documents) were sent to Systemhouse for conversion of the data.

Midway through the project, SENES was asked to make inquiries of certain Canadian institutions for additional information that could be useful to the NUTP but not necessarily suitable for inclusion in CANUT. These institutions included the Whiteshell Nuclear Research Establishment of Atomic Energy of Canada Limited (AECL), Saskatchewan Research Council (SRC), the Department of Fisheries and Oceans, Freshwater Institute, the University of Toronto Institute for Environmental Studies, and the AECB Chalk River Nuclear Laboratory.

The inquiries did not yield much information for several reasons. SRC indicated that it is independently preparing a bibliography of all of its documents that will be available to the NUTP. Chalk River suggested several general sources of information (such as UNSCEAR and IAEA reports) but did not provide any specific documents or citations. Lists of publications were provided by Whiteshell and the Institute for Environmental Studies and the Freshwater Institute. From those lists, copies of some documents were obtained which have been passed on to the NUTP.

All studies and reports were collected in accordance with the priorities established at the February 10, 1984 meeting. (The reports containing only data relevant to the modellers would be collected first. Subsequent collections would include reports containing mainly modelling data, and finally reports with only a small portion of modelling data.)

A list of the sources identified by Senes was sent to Golder to ensure there would be no overlap in the collection process.

A list of sources collected by Senes appears in Attachment D. A list of sources collected by Golder Associates appears in Attachment E.

5. DATA CONVERSION

The conversion process to transform the source documents to computer readable media involved several steps and stages. These included:

a) Analyzing the project requirements and identifying the data elements to be captured.

b) Designing the data capture forms in a generic manner to facilitate the capture of a broad spectrum of data on the fewest number of forms as was practical.

c) Interview and hire staff with appropriate experience to code the data onto the capture forms.

d) Prepare a data encoding reference manual to use when filling out the forms.

e) Train the transcription personnel on how to fill out the forms.

f) Transcribe data onto the forms.

g) Prepare Keypunch Instructions.

h) Arrange for and have the forms keypunched and verified using the services of a data-entry subcontractor.

Items a, b, d and g described above were one time costs only, and do not have to be incurred again if further data collection is required.

The analysis and identification of the required data elements began in late January, 1984. On February 10, 1984, a draft of the transcription forms containing the required data elements was presented to both Senes and Golder representatives for their review. Modifications and enhancement were suggested and these were subsequently incorporated in a second draft. On February 20, 1984, the second draft was distributed to Senes and Golder and both companies were asked to comment on the content. As there were no identified revisions required on the second draft, it was submitted for formal forms design.

As the accuracy of the data was important in the development of predictive models, it was decided that the use of professionally designed coding forms would serve to minimize the possible errors which could be introduced when filling out the forms as well as keypunching the data from the forms. Systemhouse form design specialists were used to produce the required forms. Five forms were designed, and a copy of each is included as attachment G.

Interviewing of potential data transcription personnel began in late February and concluded in early March. The search for possible candidates was limited to those who had applied for employment at Systemhouse Ltd. The criteria used to staff this position was essentially a strong background in chemistry, a university degree in science or engineering and a mature and responsible personality. Of the applicants considered, three were selected for an interview. Of the three people interviewed two were offered term positions. Only one of the candidates accepted an offer of employment.

As an aid to the transcription process, a data encoding instruction manual was prepared. This manual listed each data element to be captured and explained how it was to be transcribed on the forms. A copy of this manual is included as attachment H.

As Golder Associates were to transcribe the data from the sources they identified, and as the generic form system could be used subsequent to this data collection effort, it was decided that encoding instructions would be valuable as both a reference guide and training manual. The manual was prepared in early March in parallel with the forms design.

On February 24, 1984, a meeting was held with D.E. Systems of Ottawa and Systemhouse Ltd. to discuss the data entry of the transcription forms. Arrangement were made to have D.E. Systems keypunch, key-verify and copy the data on magnetic tape. The D.E. Systems representative, when shown the forms to be used (Draft 2), also made suggestions that would reduce the keypunching costs. These suggestions were incorporated in the form design. Keypunch instructions were prepared and given to D.E. Systems for the five forms. These are included in this report as attachment I.

The actual transcription process began on March 12, 1984. Systemhouse Ltd., who transcribed the data collected by SENES Consultants Ltd. exhausted their transcription budget on May 18, 1984. Golder Associates transcribed the geotechnical data from borehole logs they identified and had expended their transcription budget by the end of May, 1984.

Systemhouse Ltd. transcribed measurement and result data for 2398 samples from the 15 studies from SENES. Golder Associates transcribed data from 78 boreholes. All transcribed data was keypunched onto machine readable media.

A list of studies converted to machine readable media is provided in this report as attachment F.

6. DATA VERIFICATION

As the data being collected was to be used in the development of mathematical predictive models, consideration was given to quality assurance. The objective of the data verification phase was to ensure that the mechanisms and procedures put in place for the data conversion phase functioned properly. To accomplish this end, special report software was written and reports produced from the converted data. These reports were then compared against the original source documents to ensure the data was converted correctly.

This phase involved several activities:

a) Decide upon the Hardware/Software combination to be used.
b) Negotiate and obtain agreement to use the Hardware and Software.
c) Arrange for the Hardware peripherals.
d) Code and test the Reporting Software.
e) Produce the data reports.
f) Compare the reports against the source documents.
g) Correct any identified errors.
h) Reproduce the reports to ensure the errors were corrected.

Costs incurred for items a, b and d above are non-repeating costs. If further data need be collected, costs associated with items c, e, f, g and h will be incurred again, with item c) being a fixed cost and items e), f), g) and h) increasing in direct proportion to the amount of data to be verified.

In early February, 1984, a decision was reached to use the IBM 4341 mainframe computer in conjunction with the FOCUS software package, both of which were already installed at EMR's Computer Science Center. The reason for using the FOCUS software package was twofold. First of all, the existing Tailings database used the System 2000 data base management system (S2K). This had already been described as user unfriendly by people involved in the modelling contracts. As FOCUS was already installed at the Computer Service Center, it could be used without any costly software acquisition. Therefore, it was an obvious choice as an alternative to S2K. As well, being a so called fourth generation system development tool, FOCUS programs can be written and, possibly more important, modified without much of the time-consuming and costly effort required with the S2K and COBOL combination.

Once the software package had been determined, the hardware choices were limited to IBM due to the nature of the software.

The IBM 4341 at EMR was the obvious choice due to its close proximity to the National Uranium Tailings Program office, its schedule of charges and the service which could be provided.

Once the hardware/software combination had been selected, arrangements were made with the Petroleum Incentives Administration to use FOCUS, and the Computer Science Center (CSC) to use the IBM 4341. As well, due to the shortage of IBM and compatible terminals at the CSC, arrangements were made with Crowntek-Datacrown to supply an IBM 3277 terminal for installation at the CSC. The minimum rental period for the terminal was 3 months, which compared favorably to other leasing companies where a 1 year commitment was the usual minimum. The terminal was ordered on March 2, 1984 and arrived at the CSC on March 22, 1984. Unfortunately, the terminal arrived damaged and was inoperable. For this reason, the Computer Science Centre was contacted and arrangements made to use one of the CSC's terminals for a maximum of 2 hours per day. The damaged terminal was returned to the supplier at no cost to the Crown.

Although a terminal was not available until late March, the coding of the FOCUS programs began around the beginning of March. A successful test of a report program was carried out on April 8, 1984.

A preliminary data tape was received from D.E. Systems on March 26, 1984, and the corresponding verification reports were printed off on April 9, 1984. These were sent to the appropriate subcontractors for verification against the original source documents. The last batch of reports produced for verification by the subcontractors was printed on Monday, June 18, 1984. Written confirmation of the validity of the data was received from the Subcontractors and is included in this report as Attachment J. All errors discovered in the data have been highlighted on the reports and summmarized in a list which is also contained in Attachment J. The errors identified on this list were rectified by sending the magnetic tape and corresponding source transcription forms back to D.E. Systems. The error was corrected and new tapes produced. A final set of reports containing the corrected data was produced on September 28, 1984, and are a separate project deliverable in addition to this report.

7. SUMMARY AND RECOMMENDATIONS FROM SENES CONSULTANTS LTD.

This section has been included from SENES Consultants due to their understanding of the problems of existing data relevant to the Canadian National Uranium Tailings Programme.

In an effort to identify environmental data suitable for inclusion in the CANUT data base, SENES reviewed more than 100 documents and data files while sources of geotechnical information were reviewed separately by Golder. Pertinent data from 30 of the sources evaluated by SENES were subsequently passed on to Systemhouse. Data from the other reports were not passed along as project resources were exhausted before the data could be converted into machine-readable form. All of the documents and data files reviewed by SENES and a summary of the types of information they contain have been assembled into a separate report entitled "Uranium Tailings in Canada - A Descriptive Listing of Selected Environmental Data Sources."

Many potential sources of CANUT data have not yet been reviewed. Furthermore, new information is being generated more or less continuously and there are delays between monitoring and analysis and publications. These delays can be several months long. For example, inquiries made on behalf of this project early in 1984 usually realized information collected until the end of 1982 or early 1983. Since the project began, another six months or more of monitoring results have become available. This illustrates one of the key ingredients to successful data base management: the continuous effort to keep pace with information as it becomes available.

The usefulness of a uranium tailings data base is evidenced by the data bases that several of the larger companies and some provinces have developed. Designed for different purposes and users, it is not surprising that information transfer from data base to data base is very difficult or that an analytical result may end up being captured several times on different data bases. Through capture errors or variations in system structures, a result can beget seemingly contradictory data when comparing one data base to another. A national data base has the potential to both exacerbate or improve this situation depending on the care and effort that is taken.

Before additional resources are allocated to continue expanding the CANUT data base, an evaluation of its ability to meet expectations would seem prudent. Sufficient data should now be available to the System to permit such an evaluation to be made.

ATTACHMENT A - PROJECT PLAN

PROJECT PLAN TO
COLLECT DATA RELEVANT TO THE
NATIONAL URANIUM TAILINGS PROGRAM
AND CONVERT TO MACHINE READABLE MEDIA

Systemhouse Ltd.
January 1984

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1. Introduction

2. Project Plan

3. Project Schedule

4. Assumptions

Appendix

1. INTRODUCTION

The National Uranium Tailings Program (NUTP) is currently in the process of setting up a centralized information base consisting of uranium tailings data with respect to tailings sites throughout Canada.

To date, a prototype system 2000 database has been developed and is currently running at Energy Mines and Resources Computer Science Centre (CSC). The data presently residing on the database has been loaded from magnetic tapes sent to the NUTP and consists mainly of measurement and results data. These tapes were sent from five sources as follows:

1)	Environment Canada	67 Samples
2)	University of Toronto	525 Samples
3)	Government of Ontario	194 Samples
4)	Rio Algom	733 Samples
5)	Saskatchewan Research Council	(To be determined)

The main thrust of the NUTP at this stage of development is to identify other data that should be included in the centralized database. The short term needs for this data include supporting the creation of mathematical models to help predict tailings movement activitity as well as to assist development of disposal technology. Longer term needs of the NUTP would be to support a large central database available to the general public.

Another major decision currently under consideration is the technology of the database itself. The NUTP must decide if their database structure and retrieval facilities are adequate to support future users of the system, or if a different structure and perhaps database package are necessary to provide the level of service required.

2. PROJECT PLAN

The overall scope of this project is to identify sources of data suitable for inclusion in the NUTP centralized database, the gathering and transcription of the data and finally the entry and verification of the data onto a machine readable medium.

2.1 Identification of Data Sources

Meetings have already been held among the three companies involved in this activity, namely Systemhouse Ltd, Senes Consultants and Golder Associates. These meetings were held to try and define as precisely as possible, the role each company would play in identifying the sources.

Golder Associates will identify all sources of data pertaining to the following characteristics.

- Stratographic and Permeability data
- Borehole data
- Geology data and Basin Characteristics
- Groundwater data
- Design data

A complete list of the sources including those not in the public domain will be drawn up with the intent of excluding the confidential sources during the priorization process. The sources will be identified upon a data source summary form containing the following information.

- Report Title
- Report Date
- Report Number

- Report Classification - Usefulness (Priority)
  - Public/Non Public
  - Factual/Prediction/Design
  - Type of Study (Geology)
    (Hydrology)
- Company and Author
- Tailings Area
- Study Duration
- # of Pages, Tables, Figures and Appendices

In the report classification category, the usefulness of the data to NUTP will be objectively provised on a scale of 1 through 5 as follows.

1- Chemical type data
2- Hydrological data
Basin characteristics
3- Engineering design data
4- Prediction data
5- Engineering properties data

Senes Consultants Ltd. will identify environmental data at all existing tailings sites. The main categories of data to be excluded from identification are exploration data and meteorology data. A list of sources will also be drawn up by Senes Consultants Ltd., but due to the nature of the data sources they will be identifying, the data source summary document to be used will not be in the same format as the form adopted by Golder Associates. Senes Consultants Ltd. will provide a summary document that better suites their needs.

2.2 Data Gathering and Transcription

Golder Associates will gather documents related to the data in two tailings sites. The first site has been determined to be Panel in Ontario. The second site, although not yet specified, will be in Saskatchewan. Due to the complex state of the data and the technical expertise required to interpret and transcribe this type of information, Golder Associates will transcribe the data onto a form yet to be designed by Systemhouse Ltd. for subsequent use as input to the keying process.

As Senes Consultants Ltd. are going to gather a large quantity of sources, they will determine, in conjunction with the NUTP Authority, which sources are of a relative high importance. These sources will then be gathered first. Due to the fact that this data will be readily available in a tabular format, Senes will highlight or otherwise specify the data to be used and Systemhouse Ltd. will transcribe the data onto coding sheets which will be designed by SHL.

When determining who would transcribe the data, the factors taken into consideration were the technical knowledge required to interpret the reports and the probability of errors being introduced by non-technical personnel.

When representative sources have been gathered by the subcontractors, Systemhouse Ltd. will analyse the data to be transcribed and design the transcription sheets. It is expected that several different transcription sheets will be necessary to capture the wide variety of data existing in the sources. Once the forms have been designed the actual transcription process can begin.

It should be noted that the transcription process to be undertaken cannot be accurately planned in terms of effort required as it is totally dependent on the volume of samples and measurements gathered for data entry. In order to ensure a timely delivery of the end product (machine readable data), the volume of data to be transcribed will be limited by budget considerations.

2.3 Data Entry and Verification

Systemhouse Ltd. will arrange for the data entry of all transcription forms prepared. This process will be subcontracted to a firm specializing in providing this type of service. The resultant magnetic tape will then be run through a computer program prepared by Systemhouse Ltd. that will produce a report of a sample of the data captured. This report will then be verified by both Golder Associates and SENES Consultants Ltd. to ensure the data has been successfully transferred to machine readable medium. Systemhouse Ltd. will then prepare a draft report on the project and submit this to the NUTP for its comments and/or suggestions. Any comments or suggestions considered appropriate will be included in a final report which will complete the project.

3. PROJECT SCHEDULE

The following dates have been established in conjunction with the subcontractors

Identify Data Sources:	3.02.84	(Golder Assoc.)
	10.02.84	(Senes Consultants Ltd.)
Gather Documents:	3.02.84	(Golder and Assoc.)
	2.03.84	(Senes Consultants Ltd.)

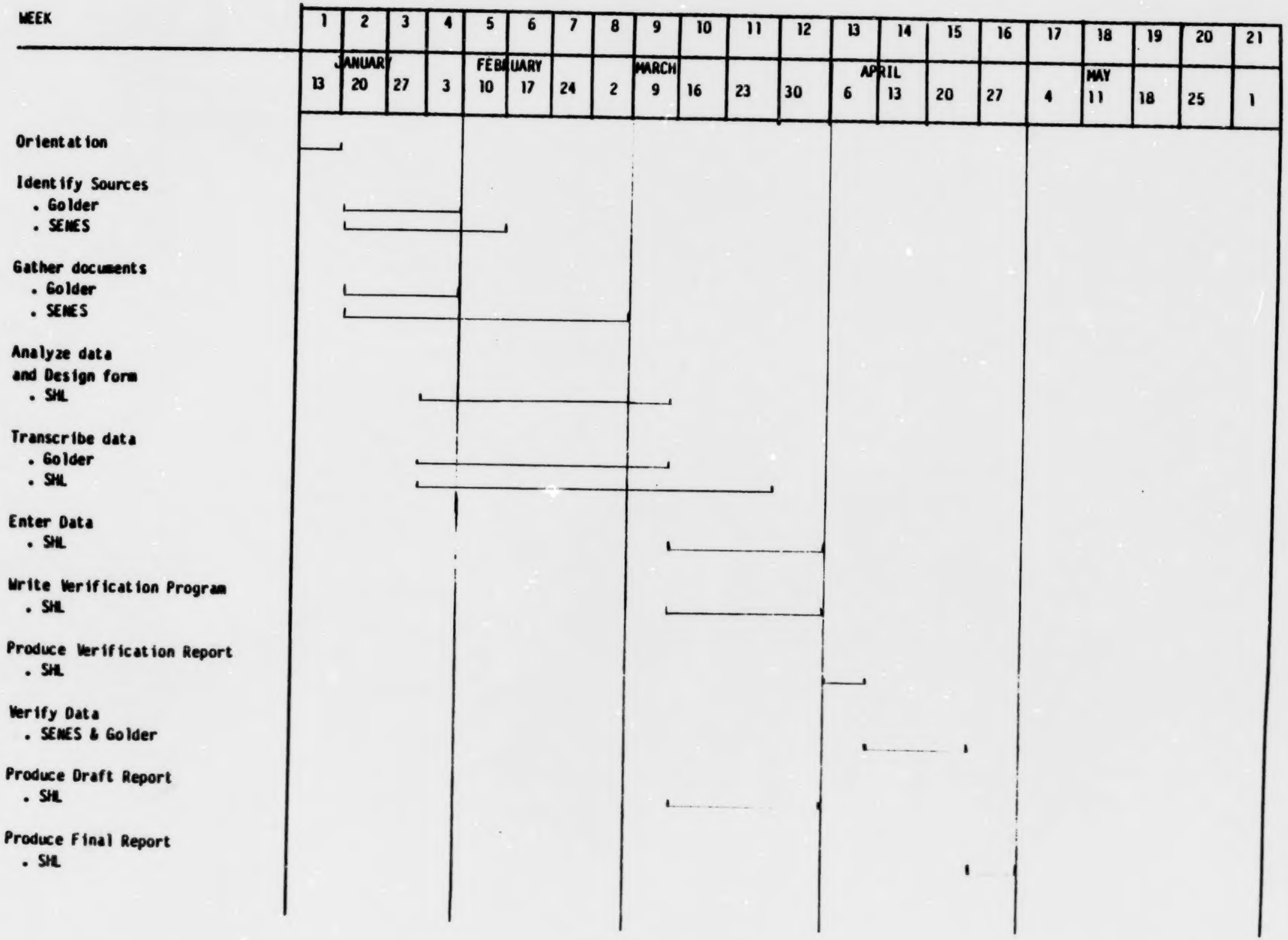
All subsequent dates used in the schedule have been estimated by Systemhouse Ltd. based on discussions with the various parties concerned and budget available to perform the task. A Gantt chart of the schedule is provided in attachment A.

4. ASSUMPTIONS

The following assumptions were used to determine the project plan and schedule.

- The Project start date was January 9, 1984.

ATTACHMENT A



ATTACHMENT B

Data Source Summary Documents from SENES Consultants Ltd.

- Cluff Lake
- Key Lake
- Rabbit Lake
- Beaverlodge
- Other Saskatchewan Sites
- Agnew Lake
- Bancroft Area
- Elliot Lake General
- Elliot Lake (Long Lake)
- Elliot Lake (Panel)
- Elliot Lake (Quirke)
- Elliot Lake (Others)

ATTACHMENT B: Cluff Lake

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Environmental and Hydrological 1981 Year-End Monitoring Report

DATE: 1982

AUTHOR(S) : Luc Delanoy, Eldon Krahn
SPONSOR(S) : Key Lake Mining Corporation

SITE(S) DISCUSSED : Key Lake

SITE STATUS : pre-operational - dewatering

REPORT TYPE : Annual monitoring report

REPORT OBJECTIVE(S): baseline monitoring

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Surface water hydrology	flows and stages	30+ Lakes and 6 creeks	continuous strip chart
Surface water quality	various physical (40+) and chemicals and radionuclides	14 Lakes and streams	weekly, monthly and semi annually sampling
Groundwater hydrology	groundwater levels	119 piezometers at 97 sites	results to be submitted in a later report
Wildlife	animals and birds	no specific locations	visual observation
Weather	wind, precipitation, temperature, humidity, evaporation	one station	twice daily

COMMENTS:

largely directed towards effects of dewatering on local water quality although other aspects of environmental monitoring are added to program

CANUT BIBLIOGRAPHIC DATA SHEET
(continuation)

Media	Parameters	Sampling Locations	# of Measurements
Air quality	radon, sulphation TSP	10 stations 10 stations 2 locations	monthly - Aug-Sept monthly - Aug-Sept a few in Nov & Dec.
Reclamation/ Vegetation	grass seed mixes	18 1/2 acres (16 areas) - sewage treatment plant, water treatment plant and airport	visual observations
Wildlife	caribou and moose population and location	2304 Km^2 area around Key Lake mine site	3 aerial surveys visual observations
Aquatic Biota	2 plant species 2 fish species Radionuclide contents	a few local lakes and creeks	1 set of samples also some 1977 & 78 data

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Environmental Year End Monitoring Report - 1982

DATE: 1983

AUTHOR(S) : P. Courtney, E. Krahn
SPONSOR(S) : Key Lake Mining Corporation

SITE(S) DISCUSSED : Key Lake

SITE STATUS : construction

REPORT TYPE : Annual monitoring report

REPORT OBJECTIVE(S): baseline and impact monitoring

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Surface water hydrology	flows and stages	28 Lakes	various
Groundwater hydrology	levels and flows	31 wells, 85 piezometers	semi annual
Groundwater quality	various (40) physical, chemical and radionuclides	manhole 1	weekly, monthly and semi annually
Surface water quality	various (40) physical, chemical and radionuclides	15 Lakes and streams	most semi-annually some more frequently
Sediment	14 physical and chemical radionuclides	6 Lakes and creeks	1 - 1982 also some 1977 and 78 data
Water	temperature, precipitation, wind, relative humidity, evaporation	one station	twice daily basis

COMMENTS:

Lab data sheets appended for water quality data
All 1977 and 1978 data supposedly taken from the EIS that was prepared in 1977

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Additional Baseline Data for Delta Lake, Saskatchewan

DATE: 1983

AUTHOR(S) : Integrated Environmental Sciences Inc.

SPONSOR(S) : Key Lake Mining Corporation

SITE(S) DISCUSSED : Key Lake (Delta Lake)

SITE STATUS : pre-operational

REPORT TYPE : special study - Draft

REPORT OBJECTIVE(S): additional baseline data for Delta Lake

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Surface water hydrology	levels estimate based on David Creek	David Creek	
Water chemistry	(45+) various chemical, physical and radionuclides	2 stations on Delta Lake	4 season samples (only radionuclide data provided)
Fish	7 species growth characteristics	Delta Lake	
Lake Morphometry	depth	43 Lake transects	

COMMENTS:

Results of quarterly surveys taken in 1982
Delta Lake receives mill effluent via two creeks but was largely overlooked in other baseline studies

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Environmental and Hydrological Monthly Monitoring Report

DATE: January-September 1983

AUTHOR(S) : E. Krahn, P. Courtney January - March
Environmental Technicians - April KLMC Environment - May-September

SPONSOR(S) : Key Lake Mining Corp.

SITE(S) DISCUSSED : Key Lake

SITE STATUS : construction - operations begin in October

REPORT TYPE : monthly monitoring report

REPORT OBJECTIVE(S): impact monitoring

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Groundwater Hydrology	levels		
Surface water hydrology	levels	23 Lakes	
Groundwater quality	6 chemical and radionuclides	Manhole # 1	weekly
Surface water quality	(35+) physical, chemical and radionuclides	6 locations	varies
Weather	Temperature, precipitation wind	one station	
Air quality	TSP sulphation	4 locations, 10 locations	
Sediment	(14) physical, chemical and radionuclides	4 locations	1 at each
Macrophytes	(6) arsenic and radionuclides	4 locations	1 at each
Fish	radionuclides	3 locations	3 species of fish

COMMENTS:

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Baseline Studies of Aquatic Sediments and Macrophytes, Fish Soil and Terrestrial Vegetation at Key Lake, Saskatchewan DATE: November 1983

AUTHOR(S) : Integrated Environmental Sciences Inc.

SPONSOR(S) : Key Lake Mining Corp.

SITE(S) DISCUSSED : Key Lake

SITE STATUS : pre-operational

REPORT TYPE : Special study undertaken June - Octover 1982 baseline study

REPORT OBJECTIVE(S): environmental impact prediction

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Sediment	(15) chemical and radionuclides	4 Lakes	One survey taken in June 1982
Aquatic Macrophytes	2 species 8 chemical, physical and radionuclides	6 lakes and creeks	3 each species taken in August 1982
Fish	2 species (6) chemical and radionuclides	3 Lakes	5 of each species at each Lake
Soil samples	(8) chemical, physical and radionuclides	9 Lakes	3 at each in September 1982
Lichen plants	(7) chemical, physical and radionuclides, 16 species	7 Lakes	3 at each
Blueberry Plants	(5) radionuclides and dryash	9 locations	3 at each collected in Aug and Oct

COMMENTS:

also includes - Comparative results collected in Northern Saskatchewan (includes KLMC, Rabbit, Cluff, Beaverlodge, Midwest) for: Aquatic Macrophytes, fish, soil samples, lichen. Largely directed towards pathways analysis.

Priority Reports for Key Lake (10 reports reviewed)

- EIS, 1979
  - compendium of environmental data gathered before 1979 K-2
  - description of proposed method of operation, tailings area construction plans

- Year End and Monthly Monitoring Reports since 1982
  - earlier reports dealt largely with de-watering K-7, K-9
  - starting in 1982 routine monitoring expanded to include air quality, radon release, sediment characteristics, aquatic biota

- Delta Lake Studies, 1980 and 1983 K-5, K-8
  - Delta Lake is the first large lake downstream of the mill discharge
  - 1980 study by SRC still to be reviewed (21 pages)

- Preliminary Pathways Study, November 1983 K-10
  - results of radionuclide analyses for various media, derivation of concentration factors, review of similar data collected at other Saskatchewan properties

ATTACHMENT B: Key Lake

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Environmental Baseline Survey of the Cluff and Carswell Lake Areas

DATE: August 1975

AUTHOR(S) : W. W. Sawchyn of Saskatchewan Research Council

SPONSOR(S) : Stearn-Rogers Inc. and Amok Limited

SITE(S) DISCUSSED : Cluff and Carswell Lakes

SITE STATUS : pre-operational

REPORT TYPE : special study

REPORT OBJECTIVE(S): baseline monitoring survey in 1974 and 1975

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
surface water hydrology	flows, morphonetry	various streams and lakes	4 sampling days in 1974, 2 in 1975
surface water quality	temperature, pH diss. oxygen, secchi disc transparency (40+) various chemical, physical and radionuclides	Cluff (2 locations) and Carswell Lakes (1) various streams and 2 lakes	up to 6x in 1974 up to 5x in 1975 but most parameters were measured twice in each year
Air quality	TSP - 3 radionuclides	Cluff Lake 1 station	Four 7-day samples
sediment	(25+) various chemical, physical and radionuclides	5 locations in Cluff Lake area	one set taken at each location
vegetation	3 species 5 radionuclides	1974 - 26 locations 1975 - 6 locations	one set taken at each location
soil	5 radionuclides	5 locations	30+ sample
fish	uranium, radium and polonium 11 fish (3 species)	Cluff Lake	10 gill net sets 18 seire net sets
Plankton, zooplankters and benthic invertebrates	population and identification of species	Cluff and Carswell Lakes various locations	various sampling days

COMMENTS:

Comprehensive study of Cluff environment except for met data. This apparently was Appendix G to the EIS.

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Annual Report, Meteorological and Air Quality Studies, Cluff Lake

DATE: September 1975

AUTHOR(S) : Stearns - Rogers Inc.
SPONSOR(S) : AMOK Ltd.

SITE(S) DISCUSSED : Cluff Lake

SITE STATUS : pre-operational

REPORT TYPE : special study - first year (Sept 74 - Aug 75) of net program

REPORT OBJECTIVE(S): baseline monitoring

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Meteorological	wind, temperature relative humidity precipitation	1 station near Cluff Lake	continuous since September 1974
Air Quality	TSP (concentration)	1 station	15 sampling periods of various duration
Air Quality	sulphur dioxide	Cluff Lake	2-8-hr and 1-3-hr duration

COMMENTS:

Data presented in tabular and graphic formats
No radioactivity or radionuclide data

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Summary of Environmental Assessment and Safety Report for AMOK Ltd. Uranium Project, Cluff Lake, Saskatchewan DATE: October 1976

AUTHOR(S) : Stearns - Roger Canada Ltd.

SPONSOR(S) : AMOK Ltd.

SITE(S) DISCUSSED : Cluff Lake

SITE STATUS : pre-operational

REPORT TYPE :

REPORT OBJECTIVE(S): summarizes EIS (see C-)

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements

a. Description of Proposed Project
b. Detailed Description of the Project: mining, ore processing, Tailings disposal, Potential Radiological Problems and Protective Measures, manpower
c. Baseline Environmental Conditions: Met and Air Quality, Hydrology and Soils, Cultural elements, Ecology
d. Environmental Impact of the Proposed Action and Mitigate Measures
e. Alternatives to the Proposed Action

COMMENTS:

No raw monitoring data - contains summaries of baseline monitoring data found in the EIS

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Environmental Assessment, Safety Report for AMOK Ltd. Uranium Project, Cluff Lake, Saskatchewan

DATE: October 1976

AUTHOR(S) : Stearns - Roger Canada Ltd.
SPONSOR(S) : AMOK Ltd.

SITE(S) DISCUSSED : Cluff Lake

SITE STATUS : pre-operational

REPORT TYPE :

REPORT OBJECTIVE(S):

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements

- background and Project Evolution
- Project description
- baseline environmental conditions
- environmental impact of the proposed action and
- mitigative measures
- alternatives to the Proposed Action

Data in this report is largely from reports C-1 and C-2
New information concerns geotechnical aspects

COMMENTS:

Baseline monitoring as outlined in: 1) Annual Report, Meteorological and air quality studies and 2) Environmental Baseline Survey of the Cluff and Carswell Lake areas by Stearns - Roger and Saskatchewan Research Council

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : The Proposed Mining of Saskatchewan's Uranium Resources at Cluff Lake - Environmental, Health and Safety Aspects DATE: 1977 (?)

AUTHOR(S) : Amok Ltd.
SPONSOR(S) :

SITE(S) DISCUSSED : Cluff Lake

SITE STATUS : pre-operational

REPORT TYPE : public relations information pamphlet

REPORT OBJECTIVE(S): public awareness of Cluff Lake operations

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements

COMMENTS:

Set up in a question-answer format regarding the Operational, Environmental, Health and Safety Aspects including a Glossary of Nuclear Terms - no data

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : The Proposed Mining of Saskatchewan's Uranium Resources at Cluff Lake - Social and Economic Factors

DATE: 1977 (?)

AUTHOR(S) : Amok Ltd.

SPONSOR(S) :

SITE(S) DISCUSSED : Cluff Lake

SITE STATUS : pre-operational

REPORT TYPE : public relations information pamphlet

REPORT OBJECTIVE(S): public awareness of operational social-economic impact on the area

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements

COMMENTS:

Set up in a question-answer format regarding social and economic factors

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : "D" Ore Body - Mining and Miscellaneous Sites Services

DATE: May 1977

AUTHOR(S) : Amok Ltd.

SPONSOR(S) :

SITE(S) DISCUSSED : "D" ore body

SITE STATUS : pre-operational

REPORT TYPE :

REPORT OBJECTIVE(S):

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements

Descriptions of equipment and schedules for development of the D ore body, mining sequence, definition of various stockpiles, surface water drainage, pit drainage water treatment pads, truck wash, offices etc.

COMMENTS:

Contains no environmental data

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Final Report - Cluff Lake Board of Inquiry - Chapter V. Long term considerations of the Section 6. Concrete Vaults and Tailings Piles DATE: 1978

AUTHOR(S) : E.D. Bayda, A.J. Groome, K.J. McCallum

SPONSOR(S) : Department of Environment

SITE(S) DISCUSSED : Cluff Lake

SITE STATUS : pre-operational

REPORT TYPE :

REPORT OBJECTIVE(S):

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements

Recommendations on decommissioning and monitoring of tailings

COMMENTS:

no site-specific data

C-9

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Environmental Impact Assessment for the Claude Ore Zone - Summary

DATE: December 1981

AUTHOR(S) : Saskatchewan Research Council

SPONSOR(S) : Cluff Mining

SITE(S) DISCUSSED : Claude Ore Zone

SITE STATUS : pre-operational

REPORT TYPE : EIS

REPORT OBJECTIVE(S):

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements

this 'summary' report refers to studies in 1979 and 1980 of the local environment but provides no references and only summary statistics (see examples)

COMMENTS:

This summary refers to other studies not yet reviewed but covered (at least in part in C-10)

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Cluff Lake Development Phase II EIS (Appendices C & F only**)

DATE: November 1982

AUTHOR(S) :

SPONSOR(S) :

SITE(S) DISCUSSED : Cluff Lake

SITE STATUS : Operational

REPORT TYPE : EIS

REPORT OBJECTIVE(S): compile historical data and impact prediction

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Air Quality	sulphur dioxide	23 stations	1982-82 monthly
Water quality	60+ chemical, physical and radionuclides	8 locations	80+ samples 1982
Water quality	various chemical, physical and radionuclides	various creeks and rivers	1974, 1975, 1978, 1979, 1980 baseline

** includes all of the water quality and air quality data gathered from 1974 to mid-1982 in the Cluff Area

COMMENTS:

Comprehensive environmental summaries are included in the Appendices to this EIS

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Annual Environmental Summary Report for 1982

DATE: 1983 (?)

AUTHOR(S) : AMOK

SPONSOR(S) :

SITE(S) DISCUSSED : Cluff Lake

SITE STATUS : Operational

REPORT TYPE : Annual report

REPORT OBJECTIVE(S): emission/effluent monitoring

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Water quality	45+ physical, chemical and radionuclides	15+ locations	100+ Tables re: Water quality
Fish + macrophytes	2 species of each 4 radionuclides	4 locations	
sediment	4 radionuclides	4 locations	2 at each
Table showing 6 reported spills of a various nature			
fauna	species identification	Cluff area	Visual observation
weather	temp. precip. evap.	1 station	daily
air quality	sulphur dioxide	4 locations	
reclamation and reveg.			

COMMENTS:

probably contains virtually all environmental data for 1982

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Hydrogeologic Monitoring at Cluff Mining during 1982

DATE: May 1983

AUTHOR(S) : W. A. Meneley Consultants Limited
SPONSOR(S) : Cluff Mining

SITE(S) DISCUSSED : Cluff Lake

SITE STATUS : Operational

REPORT TYPE : Annual report

REPORT OBJECTIVE(S): Effluent monitoring

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
surface/groundwater hydrology	levels	Tailings Dam, Toc drain sumps and Tailings Dam Piezometer and Snake Lake	continuous
Water Chemistry	(35) various chemical, physical and radionuclides	Tailings Dam, Toc drain sumps and Tailings Dam Piezometer and Snake Lake	1981-83 results of tailings pond effluent

COMMENTS:

It appears that all water levels and quality data since 1980 associated with tailings at Cluff is now in a computerized data management system (includes sumps, drains, piezometers, discharges).

C-13

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Water quality data gathered during 1982 and early 1983

DATE: mid - 1983 (?)

AUTHOR(S) :

SPONSOR(S) : AMOK

SITE(S) DISCUSSED : Cluff Lake

SITE STATUS : Operational

REPORT TYPE : Water quality data presentation

REPORT OBJECTIVE(S): Summarize and present WQ data

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements

~36 graphs showning Jan 82 - Mar 83 Water quality results at 6 locations - 6 parameters

~53 pages of Esquadat Database files: for water quality results

See C-12 - the ESQUADAT and Cluff systems should contain the same data

COMMENTS:

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Phase I Extension Mining and Milling, States Quality Monitoring Program, Monthly report for August 83

DATE: September 1983

AUTHOR(S) : AMOK

SPONSOR(S) :

SITE(S) DISCUSSED : Cluff Lake

SITE STATUS : Operational

REPORT TYPE : Monthly report

REPORT OBJECTIVE(S): Effluent monitoring

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Surface Water quality	(35+) chemical, physical and radionuclides	various lake stream and sump	varies
Macrophyte	4 radionuclides	Snake lake, Boulder and Island Creek	
Fish	Flesh and bones 4 radionuclides	3 Lakes	30
Sediment	4 radionuclides	3 lakes and 1 creek	3 at each

COMMENTS:

Priority Reports for Cluff Lake (14 reports reviewed)

. Environmental Baseline Survey, 1974 & 1975 - comprehensive data presentations	C-1, C-2
. Phase II EIS, November 1982 - appendices to this report are comprehensive summaries of environmental data gathered from 1974 to mid-1982	C-10 (can be used to replace C-1 & C-2)
. Annual Report for 1982 - contains all 1982 data for all monitoring components	C-11
. Hydrogeologic Report for 1982 - demonstrates Cluff computerized data system for tailings area, releases, seepages, U/S and D/S water quality - has data back to 1980	C-12
. Monthly Report for August 1983 - grab bag of data for May, June, August 1983 and October 1982 of various components - some of this data should be available on the Cluff data system	C-14

We read other 1983 monthly reports and all of the appendices of the 1982 EIS.

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Environmental and Hydrological 1980 Year-End Monitoring Report

DATE: 1981

AUTHOR(S) : Luc Delanoy and E. Krahn

SPONSOR(S) : Key Lake Mining Corporation

SITE(S) DISCUSSED : Key Lake

SITE STATUS : pre-operational

REPORT TYPE : Annual monitoring report

REPORT OBJECTIVE(S): baseline monitoring

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Surface water hydrology	flows and stages	several lakes and streams	many - this is the major thrust of this study
Surface water quality	various (40+) physical, chemical and radionuclides	several lakes (up to 14) and streams (up to 8) and camp water supply	sampled either monthly, quarterly, semi-annually
Ground water quality	same as surface water	samples from 17 wells reported	40+ parameters measured on two or three occasions
Weather	temperature, wind, evaporation, humidity	one station	twice daily basis
Wildlife	types of animals and birds	no specific locations	not measured, casual observations
Reclamation	plant species, various growth influences	16 test plots	largely visual observations

COMMENTS:

Largely directed towards local water quality to assess the effects of the dewatering activities

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Environmental and Hydrological 1979 Year-End Monitoring Report

DATE: 1980

AUTHOR(S) : Key Lake Mining Corporation

SPONSOR(S) :

SITE(S) DISCUSSED : Key Lake

SITE STATUS : pre-operational (dewatering - no construction)

REPORT TYPE : Annual monitoring report

REPORT OBJECTIVE(S): baseline monitoring

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Surface water hydrology and quality	35+ physical, chemical and radionuclides	10 local lakes and streams	frequency varied from weekly to quarterly
	see copy of appended schedule for details		
Groundwater	levels	13 sites	monthly
	quality	3 piezometers	spring and fall
Weather	temperature, wind, precipitation, relative humidity, humidity, dew point evaporation	station set up at south end of Key Lake	20 results on a monthly basis
Reclamation test plots	plant species, fertilizers, irrigation	16 test plots established	visual observations only

COMMENTS:

- mostly contains surface and ground water data
- marks starts of regular weather observations

K-2

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Key Lake Project (Volumes 1 and 2)

DATE: 1980

AUTHOR(S) :

SPONSOR(S) : Key Lake Mining Corporation

SITE(S) DISCUSSED : Key Lake

SITE STATUS : pre-operational

REPORT TYPE : EIS

REPORT OBJECTIVE(S): baseline data and impact prediction

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements

Largely descriptions of project history, location, proposed layout and method of operation, existing (pre-operational) environment, socio-economics, impact predictions and mitigating measures.

Conceptual design of tailings area is provided, although modifications were made prior to construction.

Much of the environmental data provided was derived from general sources (i.e., Canadian Normals, Temperature) or site-specific studies presented in other Key Lake data sheets (especially later annual monitoring reports).

In some cases, however, there are more data in this EIS than are presented in later annual reports.

some examples of EIS data are provided that illustrate data for:

- general gross Alpha, Beta, and Rn flux in the project area
- lake sediment analysis (1977, 1978)
- water quality analysis (1977, 1978)
- radionuclides in plants
- radionuclides in fish
- radionuclides in aquatic macrophytes

COMMENTS:

All of this data is tabulated in the appendices which comprise Volume 2. These should be quite complete for data gathered before 1979.

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Environmental Overview Of the Impact of Proposed Dewatering Operations In the Key Lake Area

DATE: February 1977

AUTHOR(S) : Beak Consultants Limited

SPONSOR(S) : Uramerz Exploration and Mining Limited

SITE(S) DISCUSSED : Key Lake

SITE STATUS : pre-operational

REPORT TYPE : environmental overview

REPORT OBJECTIVE(S): baseline monitoring and impact prediction

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Terrain	general descriptions of topography and surficial materials	immediate vicinities around 12 local lakes and streams	no specific monitoring program
Vegetation	general descriptions of local species	immediate vicinities around 12 local lakes and streams	name-based on photography and ground truthing
Fisheries	population sizes species found, weight, stomach contents, plankton crops, TDS levels	nets set in 4 local lakes	7 tables of various fish crop characteristics
Surface water quality*	pH, major ions, several metals, and more	9 lakes and 1 river in the Key Lake area	35+ at 10 locations

* these data are actually from a report prepared by Stevenson International Groundwater Consultants Limited in 1977 and some monitoring by the Saskatchewan Water Pollution Control Board

COMMENTS:

- not much "hard" data is contained in this report
- the referenced Stevenson 1977 report may be a good source of baseline surface water quality data

ATTACHMENT B: Rabbit Lake

Priority Reports for Rabbit Lake (15 reports reviewed)

. Survey of Wollaston Lake area, 1973 - comprehensive survey of local environment - includes some earlier data as well	R-2
. EPS study of water pollution, 1978 - special study of water, sediments, fish, benthic organisms - refers to Beak, 1971 study which has not yet been reviewed	R-6
. Collins Bay B-Zone EIS, 1980-1981 - could be comprehensive survey of data gathered before 1980 but we have selected parts only	R-7
Annual Reports for 1975 through 1982 - results of full monitoring program, although from 75 to 79, we have air quality data only!	R-8, R-10, R-11, R-12
. Eldor Data Trend Tables, 1983 - contains some 1972 data and data from 1980-1983 for sediment, fish, water, macrophytes, aquatic vegetation - some duplication of annual report data	R-13
. Monthly Reports for 1983 - environmental data up to October	R-14, R-15

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Monthly Environmental Reports

DATE: Feb - Oct/83

AUTHOR(S) : Eldorado Resources Limited

SPONSOR(S) : As above

SITE(S) DISCUSSED : Rabbit Lake

SITE STATUS : Operational

REPORT TYPE : Monthly monitoring report

REPORT OBJECTIVE(S): Emissions/effluent monitoring

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Air Quality	S.S./SO_2	- 4 sites (S.S.) - 1 site	Weekly at 4 sites Hourly at 1 site

COMMENTS:

- Water quality data collected but not available

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Water Quality Graphs

DATE: Jan 82 - Oct 83

AUTHOR(S) : Eldor Mines/

SPONSOR(S) :

SITE(S) DISCUSSED : Rabbit Lake

SITE STATUS : Operating

REPORT TYPE : monitoring report

REPORT OBJECTIVE(S): effluent monitoring

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Water quality	9 various radionuclide physical and chemical	6 stations	varies (40+) graphs

COMMENTS:

Water quality graphs - no numerical data

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Sediment and Water Quality Data, Saskatchewan Environment Comments on Trends

DATE: 1983

AUTHOR(S) : Eldor Mines

SPONSOR(S) : Saskatchewan Environment

SITE(S) DISCUSSED : Rabbit Lake

SITE STATUS : Operating

REPORT TYPE : special

REPORT OBJECTIVE(S): environmental trends from 72 - 82

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Sediments	4 radionuclides	1972 - (11) stations 1981 - (7) stations 1980 - (4) stations 1982 - (7) stations 1983 - (7) stations	
Plankton	Weight analysis	Wollaston Lake	1975, 1980
Macrophytes	4 radionuclides	(2) Wollaston Lake	1981, 1980
Fish	4 radionuclides	(2) Wollaston Lake	1981, 1980, 1972, 1982
Water quality	5 radionuclides	11 sites	(25+) 1972

COMMENTS:

Contains some data from 1972

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Annual Environmental Report - 1982

DATE: 1983

AUTHOR(S) : Eldorado Resources Ltd.

SPONSOR(S) :

SITE(S) DISCUSSED : Rabbit Lake

SITE STATUS : Operational

REPORT TYPE : Annual Report

REPORT OBJECTIVE(S):

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Air quality	(10) radionuclides and heavy metals	4 sites	monthly
	SO_3	8 sites	monthly
Water quality	nutrients, major ions radionuclides, heavy metals and physical	19 sites	
Sediments	4 radionuclides	7 sites	
Fish	4 radionuclides	(2) Wollaston Lake	

R-11

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Yearly Environmental Report

DATE: 1975 - 1982

AUTHOR(S) : Gulf Minerals Canada Limited

SPONSOR(S) : Gulf Minerals Canada Limited

SITE(S) DISCUSSED : Rabbit Lake

SITE STATUS : Operational

REPORT TYPE : Annual Monitoring Report

REPORT OBJECTIVE(S): Emissions/Effluent Monitoring

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Air Quality	Radionuclides and 6 heavy metals	4 sites	Bl - Yearly at 4 sites (1980-1982)
	S.S./S.O_2 Sulphation	- 4 sites (S.S.)	Weekly at 4 sites
		- 1 site (SO_2)	Hourly at 1 site
		- 8 sites (Sulphation)	Monthly at 8 sites

COMMENTS:

- Air quality data only, some data missing or scrambled
- Data in same tabular format as other annual reports

R-10

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Annual Environmental Report - 1981

DATE: 1982

AUTHOR(S) : Gulf Minerals Canada Limited

SPONSOR(S) :

SITE(S) DISCUSSED : Rabbit Lake

SITE STATUS : Operational

REPORT TYPE : Annual Report

REPORT OBJECTIVE(S):

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Air quality	(10) radionuclide and heavy metals	4 sites	
	SO_3	8 sites	monthly
Water quality	(20+) nutrients major ions, radionuclides, heavy metals and physical	15 sites	monthly
Sediments	4 radionuclides	7 locations	
Plankton	depth, dryweight, Ashweight	2 bays	
Fish	4 radionuclides	(2) Wollaston Lake	
Acquatic Vegetation	4 radionuclides 2 species	(2) Wollaston Lake	

COMMENTS:

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Report to Gulf Minerals Canada Ltd. on Tailing Area Seepage Study, Rabbit lake Uranium Mine

DATE: January 29, 1982

AUTHOR(S) : Geocon Inc.

SPONSOR(S) : Gulf Minerals Canada Ltd.

SITE(S) DISCUSSED : Rabbit Lake

SITE STATUS : Operating

REPORT TYPE : Special study

REPORT OBJECTIVE(S): tailings seepage potential

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Met data	precipitation	Collins Bay	
Rock exploration		(17) tailings area	26 track etch reports
Soil exploration			7 track etch reports
Permeability			6 Histograms
Groundwater hydrology	levels and flows		

COMMENTS:

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Annual Environment Report - 1980

DATE: 1981

AUTHOR(S) : Gulf Minerals Canada Limited

SPONSOR(S) : Gulf Minerals Canada Limited

SITE(S) DISCUSSED : Rabbit Lake

SITE STATUS : Operating

REPORT TYPE : Annual Monitoring Report

REPORT OBJECTIVE(S): Emission/Effluent Monitoring

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Surface water quality	pH, Cond., S.S., Nutrients, Heavy Metals, Radionuclides	9 sites	Quarterly to 1 per month at 9 sites
Dam Seepage	pH, Cond., S.S., Nutrients Radionuclides	3 sites	Monthly at 3 sites
Groundwater	pH, Cond., S.S., Nutrients, Radionuclides	2 sites	Monthly at 2 sites exclude winter
Air Quality	SO_2, S.S. Sulphation	4 sites (S.S.)	Weekly at 4 sites
		8 sites (sulphation)	Monthly at 4 sites
		1 site (SO_2)	Monthly at 1 site

COMMENTS:

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : The Collins Bay B-Zone Development

DATE: 1980/1981

AUTHOR(S) : Geocon/A.H. Ross

SPONSOR(S) : Gulf Minerals Canada Limited

SITE(S) DISCUSSED : Collins Bay B-Zone - Rabbit Lake

SITE STATUS : Pre-operational

REPORT TYPE : EIS

REPORT OBJECTIVE(S): Impact Prediction

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements

3 volumes and 3 addendums summarizing existing data in report form and predicting future impact from Collins Bay B-Zone Development

COMMENTS:

- Not sure this EIS has all the raw data collected. Saskmet did much of this data generation. The EIS is a summary and interpretation only. Data presented is probably a summary of existing Rabbit Lake data up to the end of 1979. That could be more company confidential data.

R-6

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : A Study of Water Pollution in the Vicinity of Gulf Minerals Rabbit Lake

DATE: 1978

AUTHOR(S) : Robinson/Ruggles/Zaidi

SPONSOR(S) : Environment Canada

SITE(S) DISCUSSED : Rabbit Lake

SITE STATUS : Operating

REPORT TYPE : Special Report

REPORT OBJECTIVE(S): Effluent Monitoring

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Water Quality	- Temp./Conduct./ Salinity/pH/Do S.S./Nutrients, Metals, Radionuclides	6 sites	Grab samples at 6 sites (4 Tables)
	- Ammonia	3 sites	Grab samples at 3 sites (5 Table 3 Graphs)
Sediment	Metal, Radionuclides	4 sites	Grab samples at 4 sites (2 Tables)
Plankton	Species populations	3 sites	Grab samples at 3 sites (4 Tables, 4 Graphs)
Benthic Invert.	- Species populations	4 sites	Grab samples at 4 sites (3 Tables)
	- Radionuclides	1 site (Rabbit Creek)	3 at 1 site (1 Table)
Fish	Species, Length, Weight, Radionuclides	2 sites Gill nets	2-16 at 2 sites (1 Table)

COMMENTS:

- Reference to Beak, 1971 may provide Baseline Water Quality Data for receiving waters
- Good source for water quality/fish

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Corrective Action and Results in Minimizing Ra-226 Concentration in Mine-Mill Effluents of the Rabbit Lake Uranium Operation DATE: 1977

AUTHOR(S) : Gulf Minerals Canada Limited

SPONSOR(S) : Gulf Minerals Canada Limited

SITE(S) DISCUSSED : Rabbit Lake

SITE STATUS : Operating

REPORT TYPE : Special Report (Ra-226 Removal)

REPORT OBJECTIVE(S): Effluent Monitoring

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Water Quality	Ra-226	Overflow from Pond	6 at 1 site (1977)

COMMENTS:

- Data showing first results from Ra-226 removal program

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Mine Water Treatment

DATE: July/1977

AUTHOR(S) : Gulf Minerals Canada Limited

SPONSOR(S) : Gulf Minerals Canada Limited

SITE(S) DISCUSSED : Rabbit Lake

SITE STATUS : Operating

REPORT TYPE : Monitoring

REPORT OBJECTIVE(S): Effluent Monitoring

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Water Quality	Ra-226	1 site (Rabbit Lake Diversion)	Weekly July 76 - May 77

COMMENTS:

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Wildlife and Vegetation Survey at Gulf Minerals Uranium Operation at Wollaston Lake

DATE: 1976

AUTHOR(S) : SRC

SPONSOR(S) : Gulf Minerals Canada Limited

SITE(S) DISCUSSED : Rabbit Lake

SITE STATUS : Operational

REPORT TYPE : Monitoring Report

REPORT OBJECTIVE(S): Baseline Monitoring

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Wildlife and Vegetation	Species, Population		Air/Ground Observation

COMMENTS:

- Not much value - species and population only
- No analysis conducted

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Environmental Survey of Wollaston Lake, Saskatchewan

DATE: September, 1973

AUTHOR(S) : SRC, W.W. Sawchyn

SPONSOR(S) : Gulf Minerals Canada Limited

SITE(S) DISCUSSED : Rabbit Lake

SITE STATUS : Pre-operational

REPORT TYPE :

REPORT OBJECTIVE(S): Baseline Monitoring

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Morphometry	Volume, total surface area, depth	5 major bays on west side of lake	4-9 at five locations
Surface water	Physical - Temperature, Alk, DO, pH Conduct, Colour	5 bays, 3 lakes	Weekly June 16 - August 31 & March 7-9 (17 Graphs/12 Tables)
	Chemical - Ions, Bicarbonates, 12 Minerals	5 bays, 4 lake	3 at 9 locations July 1972 2 at 9 locations March 1973 (4 Tables)
Sediments	Metals (10)	5 bays, 2 lake	1 at each location March 1973
Plankton	Quantity/Quality	5 bays, 3 lake	20 species at 8 locations
Bottom Fauna	Quantity/Quality	5 bays, 2 lake	11 species at 7 locations

CANUT BIBLIOGRAPHIC DATA SHEET
(continuation)

Media	Parameters	Sampling Locations	# of Measurements
Fish	Size, variety population	5 Bays, various Lake	26 Seine Hauls at 13 locations 21 Gill Hauls at 10 locations (12 Graphs 5 Tables)
Radiation-Water	Uranium/Daughters	5 Bays, 6 various locations	1-7 at each location
Radiation-Sediment	Uranium/Daughters	10 locations	Not known
Radiation-Fish	Uranium/Daughters	4 Bays	10-20 at 4 locations
Air	Nitrogen oxides, H_2S, SO_2	(1) Mill Site Area	Not known August 1-3, 1970

COMMENTS:

- Good source of surface water quality for receiving waters

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Application for Approval to Discharge Industrial Waste

DATE: April, 1973

AUTHOR(S) : Gulf Minerals Canada Limited

SPONSOR(S) : Gulf Minerals Canada Limited

SITE(S) DISCUSSED : Rabbit Lake

SITE STATUS : Pre-operational

REPORT TYPE : Special Report (Application for Approval)

REPORT OBJECTIVE(S): Impact Prediction/Impact Monitoring

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Meteorology	General description of area	Brochet, Manitoba	Historical Data
Land Use	General description of Trapping, Fishing	None	None
Groundwater	General description of groundwater hydrology	Not known	Not known
Surface water	General description of Runoff, Effluent Water Quality Predictions	8 (Wollaston Lake)	Not known

COMMENTS:

- No "Hard" Data - mostly predictive
- Data for groundwater from Underwood and McLellan
- Data for surface water quality from SRC, 1973

ATTACHMENT B: Beaverlodge

Priority Reports for Beaverlodge Area (2 reports reviewed)

. Report Number 2 of the Decommissioning/Reclamation series, 1983
  - a summary of all the environmental data gathered in the Beaverlodge area B-2
  - effectively describes the monitoring that has been done (when, where, by whom, frequency, etc.)
  - presents some summary statistics
  - most raw data is available only by going back to original reports
  - most water quality data from the area has been put on the ESQUADAT system which includes at least 30 stations
  - focusses on events/measurements made since 1980

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Decommissioning of the Beaverlodge Mine/Mill Operations and Reclamation of the Site - Report # 2

DATE: February, 1983

AUTHOR(S) : MacLaren Plansearch Inc.

SPONSOR(S) : Eldorado Resources Limited

SITE(S) DISCUSSED : Beaverlodge Area

SITE STATUS : data gathered during operations

REPORT TYPE : Historical review

REPORT OBJECTIVE(S): summary of environmental data

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Air quality	TSP several radionuclides	upto 3	from 13 to 17
	dustfall (total and several radionuclides)	1	4
	radon flux	10+ locations	1
	radon exhalation rates	3	1
Soils	several radionuclides, % 200	2	1
Water	40+ parameters including major ions, radionuclides, etc.	varies from 15 to 40+	extremely variable from 10 to 400 per parameter

All data should be incorporated into ESQUADAT system. This report graphically presents results of monitoring by Eldorado in 1982.

Data is also summarized that originally was presented in several reports (ie studies by Ruggles and Rowley, Zaida, SRC) including those about Dubyna. These largely address the presence of radionuclides in water, tailings, sediment, aquatic plants, insects, fish, dust etc.

This ERL summary report effectively points to all of these reports and generally indicates their contents.

COMMENTS:

Compendium of all readily available data gathered in the Beaverlodge area. Original sources need to be consulted to obtain raw data.

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Survey of the Radionuclide Levels of Water and Sediments Downstream from the Hab Waste Rock Pile

DATE: 1981

AUTHOR(S) : J.M. White

SPONSOR(S) : Eldorado Nuclear Limited

SITE(S) DISCUSSED : Downstream of Hab Waste Rock Pile, Pistol Lake

SITE STATUS :

REPORT TYPE :

REPORT OBJECTIVE(S):

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Water	U	16	4
	Ra-226	16	4
	Po-210	16	4
	Pb-210	16	4
	Th-230	16	4
Sediments	U	13	1
	Ra-226	13	1
	Po-210	13	1
	Pb-210	13	1
	Th-230	13	1

ATTACHMENT B: Other Saskatchewan Sites

Priority Reports for Other Saskatchewan Sites (2 reports reviewed)

. a special study of abandoned tailings areas, 1981 S-1

- Limited amount of data presented but little else has been found

[redacted]

SUMMARY REPORT ON THE SURFACE WATER AND GROUNDWATER INVESTIGATIONS OF THE LORADO MILL AREA AND METEOROLOGY DATA FOR THE GUNNAR URANIUM TAILINGS

VOL 1 & Volume 2

J. Whiting, E. Christiansen,
H. Heuser, J. S. Kermeen, H. Maathuis, P. Machibroda

MARCH, 1982

SRC PUBLICATION NO. E-820-4-C-82

SASKATCHEWAN RESEARCH COUNCIL

ENVIRONMENTAL CONDITIONS OF TWO ABANDONED URANIUM MILL TAILINGS SITES IN NORTHERN SASKATCHEWAN.

For: Saskatchewan Environment, Regina, Saskatchewan, S4P 3V5.

By: M: Kalin, Institute for Environmental Studies, University of Toronto, Toronto, Ontario, M5S 1A4.

Under: Saskatchewan Environment Contract No. 32 (81-82).

Period: April 1, 1981 - March 31, 1982.

A Preliminary Assessment of the Environmental Conditions of two Abandoned Uranium Mill Tailings Sites in Saskatchewan.

submitted to:

Saskatchewan Environment
and Environment Canada

by:

M. Kalin
Institute for Environmental Studies
University of Toronto
Toronto, Ontario.

In fulfillment of Contract #31 (80-81)
and Contract dated July 4th, 1980.

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Limnological and Fisheries Investigation of the Flooded Open Pit at the Gunnar Uranium Mine

DATE: February 1982

AUTHOR(S) : Patricia I. Tones

SPONSOR(S) : Saskatchewan Research Council
SRC Publication Number C-805 - 10 - E-82

SITE(S) DISCUSSED : Gunnar Open Pit

SITE STATUS : Abandoned

REPORT TYPE : Special Study

REPORT OBJECTIVE(S): Impact Monitoring

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Water	Temperature	1	3 (depth profiles)
	Dissolved O_2	1	3 (depth profiles)
	Specific Conditions	1	3 (depth profiles)
Water	HCO_3	4	3
	Cu	4	3
	Cl	4	3
	Mg	4	3
	K	4	3
	Na	4	3
	SO_4	4	3
	As	4	3
	HCN	4	3
	Hg	4	3
	Se	4	3
	Cd	4	3
	Cr	4	3
	Co	4	3

COMMENTS:

CANUT BIBLIOGRAPHIC DATA SHEET
(continuation)

Media	Parameters	Sampling Locations	# of Measurements
Water (cont'd)	Cu	4	3
	Alkalinity	4	3
	TKN	4	3
	Ortho P	4	3
	Total P	4	3
	Total Inorg. C	4	3
	Total Org. C	4	3
	TDS	4	3
	TSS	4	3
	Pb-210	4	3
	Ra-226	4	3
	U	4	3
	Fe	4	3
	Pb	4	3
	Mn	4	3
	Ni	4	3
	Zn	4	3
	Al	4	3
	Ba	4	3
	Mo	4	3
	Th-232, 230, 228, 227	3	3
Sediment	TKN	4	4
	Total P	4	4
	Total C	4	4
	Org. C	4	4
	Inorg. C	4	4
	Ra-226	4	4
	Pb-210	4	4
	Po-210	4	4
	Th	4	4
	Wat Sol Sulphate	4	4
	Moisture	4	4
	LOI	4	4
	Colour	4	4
	Texture	4	4
	As	4	4
	Ba	4	4
	Cd	4	4
	Cr	4	4
	Co	4	4
	Cu	4	4
	U	4	4
	Fe	4	4
	Pb	4	4
	Mn	4	4
	Hg	4	4
	Ni	4	4
	V	4	4
	Zn	4	4

CANUT BIBLIOGRAPHIC DATA SHEET
(continuation)

Media	Parameters	Sampling Locations	# of Measurements
Water	HCO_3	4	4
	Ca	4	4
	Cl	4	4
	Mg	4	4
	K	4	4
	Na	4	4
	SO_4	4	4
	Alk	4	4
	TIC	4	4
	TOC	4	4
	TDS	4	4
	TSS	4	4
	TKN	4	4
	Tot-P	4	4
	Pb-210	4	4
	Ra-226	4	4
	U	4	4
	As	4	4
	HCN	4	4
	Hg	4	4
	Se	4	4
	Ca	4	4
	Cr	4	4
	Co	4	4
	Cu	4	4
	Fe	4	4
	Pb	4	4
	Mn	4	4
	Ni	4	4
	Zn	4	4
	Al	4	4
	Ba	4	4
	Mo	4	4
Bacteria	Plate Counts	3	3
Physical to Plankton	by class, genus and species	3	67
Littoral Fauna	by number and species	1	1
Benthic Invertabrates	by number and species	5	20
Zoo Plankton	by number and species	2	4

CANUT BIBLIOGRAPHIC DATA SHEET
(continuation)

Media	Parameters	Sampling Locations	# of Measurements
Fish	number and size, weight, age and sex	10	55
	Pb-210	6	6
	Ra-226	6	6
	U	6	6

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : The Problem of Abandoned Uranium Tailings in Northern Saskatchewan - An Overview

DATE: November 1981

AUTHOR(S) : S. Swanzon, Z. Abouguendia

SPONSOR(S) : Saskatchewan Research Council

SRC Publication Number C-805 - 48 - C-81

SITE(S) DISCUSSED : Gunnar Lorado

SITE STATUS : Abandoned

REPORT TYPE : Special Study

REPORT OBJECTIVE(S):

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Overall	Area/Extent	2	2
Tailings	pH	21	21
	Conductivity	21	21
	Salinity	21	21
	Moisture	21	21

COMMENTS:

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : A Plant Taxonomic Survey of the Uranium City Region, Lake Athabasca North Shore, Emphasizing the Naturally Colonizing Plants on Uranium Mines and Mill Wastes and Other Human-Disturb Sites

DATE: July 1982

AUTHOR(S) : V.L. Harms

SPONSOR(S) : Saskatchewan Department of Environment

SITE(S) DISCUSSED : Gunnar, Lorado, Genex, Cayzor - Athabasca

SITE STATUS : Abandoned

REPORT TYPE : Special Study

REPORT OBJECTIVE(S):

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements

A review and inventory of plant species and densities occuring on the tailings and waste rock piles of the mines mentioned above

COMMENTS:

ATTACHMENT B: Agnew Lake

Priority Reports for Agnew Lake (5 reports reviewed)

. MOE air quality surveys in 1977 and 1978 - the most comprehensive surveys of this type reviewed	A-1, A-3
. pathways analysis at close-out - one of the few sources of water quality data reviewed	A-5

Additional information may be available from the mining company

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Radioactivity Pathways Analysis for the Agnew Lake Uranium Mine at Close Out

DATE: June 1982

AUTHOR(S) : SENES Consultants Ltd.

SPONSOR(S) : Agnew Lake Mines Limited

SITE(S) DISCUSSED : Agnew Lake Mines

SITE STATUS : Dormant

REPORT TYPE : Special Study

REPORT OBJECTIVE(S): Expose assessment/decommissioning

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Water quality	numerous	14	annual 1981

COMMENTS:

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Unpublished (permission may be necessary)

DATE: 1981

AUTHOR(S) : Agnew Lake Mines Limited

SPONSOR(S) : Agnew Lake Mines Limited

SITE(S) DISCUSSED : Agnew Lake Mines Ltd.

SITE STATUS : Operating

REPORT TYPE : Monthly reports to MOE

REPORT OBJECTIVE(S): Monthly monitoring reports

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Water quality	numerous	drainage, sumps, surface water	- averages for Sept. and Nov/81 - individual #s for Oct & Dec 81

COMMENTS:

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Agnew Lake Mines Hi-Vol. Sampling Survey June 1978, (not published)

DATE: 1979

AUTHOR(S) : R. Potvin

SPONSOR(S) : MOE, Air Quality Assessment Unit
Technical Support Section

SITE(S) DISCUSSED : Agnew Lake

SITE STATUS : Operating

REPORT TYPE : Special study

REPORT OBJECTIVE(S): Impact assessment

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Hi-vol	TSP, Lot. sol. sulphates, nitrates, Ra-226, U-tot Th-230, 232, 228	4	12

COMMENTS:

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Agnew Lake Mines Ltd. : Safety Report

DATE: July 1979

AUTHOR(S) : Agnew Lake Mines Ltd.
SPONSOR(S) : Agnew Lake Mines Ltd.

SITE(S) DISCUSSED : Agnew Lake Mines
SITE STATUS : Active
REPORT TYPE : Annual monitoring report
REPORT OBJECTIVE(S): Impact monitoring

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Water	Water balance		
Water quality	pH, SS, DS, Free Amonia as N, Sulphate as SO_4 Sulphate Diss., Ra-226, Tot Ra-226 U as U_3O_8	4	annual averages only
Neutral barren solution	13 parameters	annual average	

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : MOE Memorandum to L. Fitz about the Hi-Vol Survey at Agnew Lakes Mines (May, June 1977)

DATE: May 24, 1978

AUTHOR(S) : R. Potvin, Air Quality Analyst

SPONSOR(S) : MOE Northeastern Region

SITE(S) DISCUSSED : Agnew Lake

SITE STATUS : Operating

REPORT TYPE : Special study

REPORT OBJECTIVE(S): Impact monitoring

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
hi-vol	TSP, gross Alpha, gross Beta, Rs-226, U-tot total sol. sulphates	4	46

COMMENTS:

ATTACHMENT B: Bancroft Area

Priority Reports for the Bancroft Area (9 reports reviewed)

- the OWRC report, 1972 M-1
    - earliest environmental report of area reviewed, included all properties
- the 1977 MOE report of water quality at Dyno and Bancroft M-2
    - we have thus far reviewed only sections of this report
- the 1979 AECB study of all 3 properties M-3
    - water quality data
- the Bicroft status report, 1981 M-7
    - water and air quality data
- the Madawaska close-out report M-9
    - good review of property history
    - most of the data are averages and 'raw' data is not presented

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Proposal for Decommissioning and Close-out of the Bancroft Property

DATE: June, 1983

AUTHOR(S) : F. Clyde Lendrum Consulting Limited

SPONSOR(S) : Madawaska Mines Limited

SITE(S) DISCUSSED : Madawaska Mine, Bancroft

SITE STATUS : dormant

REPORT TYPE : Special study

REPORT OBJECTIVE(S): Source characterization

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Water quality	Ra-226	6 locations	30 times (1961-62)

COMMENTS:

- good bibliographic source for process info., waste treatment, tailings characterization
- must be careful about summaries - original references

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Site Inspection - May 1, 1982, Bicroft Tailings Area, Bicroft, Ontario

DATE: May 1, 1983

AUTHOR(S) : Golder Associates

SPONSOR(S) : Long Lac Mineral Exploration Limited

SITE(S) DISCUSSED : Bicroft

SITE STATUS : dormant

REPORT TYPE : Special study

REPORT OBJECTIVE(S): annual visual inspection

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements

COMMENTS:

- bibliographic interest only

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Status of Waste Management Areas and Proposed Remedial Measures, Bicroft Uranium Mine, Bancroft, Ontario

DATE: July, 1981

AUTHOR(S) : Golder Associates

SPONSOR(S) : Long Lac Mineral Exploration Limited

SITE(S) DISCUSSED : Bicroft Uranium Mine: Auger Lake, South Tailings Area, Beaver Pond

SITE STATUS : dormant

REPORT TYPE : Special study

REPORT OBJECTIVE(S): source description

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Water	stream flow	4	estimates
Water	Ra, U, pH, heavy metals, TDS, sulphates, iron, manganese	several	no specifics, descriptive only
Ambient air	gamma levels at 1 m	4 areas	ranges only

COMMENTS:

- low potential for data entry - however, a good reference for the bibliography

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Report to Willroy Mines Limited: Inspection of Bicroft Tailings Area

DATE: November, 1980

AUTHOR(S) : Golder Associates

SPONSOR(S) : Willroy Mines Limited

SITE(S) DISCUSSED : Bicroft

SITE STATUS : dormant

REPORT TYPE : Special study

REPORT OBJECTIVE(S): site inspection

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements

COMMENTS:

- low potential for data entry
- good for bibliography - site description

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Milling Practice at Madawaska Mines Ltd.

DATE: April 30, 1980

AUTHOR(S) : Madawaska Mines Ltd.

SPONSOR(S) :

SITE(S) DISCUSSED : Madawaska Mines - Bancroft

SITE STATUS :

REPORT TYPE : Presentation to Canadian Uranium Prod. Met. Committee

REPORT OBJECTIVE(S):

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements

Brief write-up on tailings treated as on attached sheet

COMMENTS:

Not much data in this paper

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Cardiff Area - Radiological Program

DATE: 1979, 80

AUTHOR(S) : MOE

SPONSOR(S) : MOE

SITE(S) DISCUSSED : Bicroft, Dyno

SITE STATUS : Dormant, Abandoned

REPORT TYPE : Annual monitoring report(s)

REPORT OBJECTIVE(S): Baseline and impact monitoring

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Water	TDS, Ra-226, gross Alpha, Beta, U-238, Rn	32	varies

COMMENTS:

- we do not have the full report - this could be a NAQUADAT?

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Gamma Exposure Levels in the Vicinity of Uranium Tailings Areas in the Bancroft Region

DATE: July 1979

AUTHOR(S) : James T. MacLaren Limited

SPONSOR(S) : Atomic Energy Control Board

SITE(S) DISCUSSED : Bicroft, Dyno, Madawaska (Faraday), numerous exploration sites

SITE STATUS : Dcrmant, abandoned, dormant, abandoned

REPORT TYPE : Special study

REPORT OBJECTIVE(S): Source characterization/exposure assessment

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Ambient air	gamma levels at 1 m	regional	several - contours and summaries only
Water	radium	tailings, seepage, surface water for mine areas	21

COMMENTS:

- gamma not suitable for data base - water quality is
- some of this data is not available elsewhere

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE :

DATE: 1978

AUTHOR(S) :

SPONSOR(S) : Ministry of the Environment

SITE(S) DISCUSSED : Dyno, Bicroft

SITE STATUS : Abandoned, Dormant

REPORT TYPE : Special study

REPORT OBJECTIVE(S): Water quality study in 1977

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Water quality	Ra-226, TDS, sulphate, pH, iron, manganese	up to 22 stations in Eels and Paudash Lake Basins	monthly measurements same data presented for 1966 to 1977

COMMENTS:

- we have portions of this report at this time

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Water Pollution from the Uranium Mining Industry in the Elliot Lake and Bancroft Areas, Vol. 1 Summaries, Vol. 2 - Detailed Findings DATE: March 1972

AUTHOR(S) : Ontario Water Resources Commission

SPONSOR(S) : Ontario Water Resources Commission

SITE(S) DISCUSSED : Bancroft

SITE STATUS : (operational at the time)

REPORT TYPE : Special study

REPORT OBJECTIVE(S): Impact assessment

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Water quality	TDS, TSS, phos-tot etc.	numerous	numerous
Sediments	Ra-226, gross Alpha, Beta, U-238	numerous	numerous
Benthos	Ra-226, gross Alpha, Beta U-238	numerous	numerous

COMMENTS:

- good reference

135 St Clair West

MOE - Madawaska

Decommissioning Report

- "Madaska mines has 25 years of historical data"

- MOE Report RPL 77-371 9/8/77
  RPL 77-493 21/9/77

- "The Physical, Chemical and Radiological Characteristics of the Surface Layers of Ontario Uranium Tailings Deposits, 1982" J.R. Hawley, Ontario Ministry of the Environment

  Dep. Minister's Committee "Radiological Water Pollution in the Elliot Lake and Bancroft Areas, 1965"

Bibliography

D.F. Hewitt, "Uranium and Thorium Deposits of Southern Ontario." Mineral Resources Circular No. 4, Ontario Department of Mines, 1967

OWRC Report on Radiological Pollution in the Elliot Lake and Bancroft Area, 1966

Dodds, Jurgens and Freitag, "Retention of Radioactive Wastes at An Operating Uranium Mill Site", C.I.M. Meeking, Thunder Bay, Ontario, November 19-21, 1981

ATTACHMENT B: Elliot Lake General

Priority Reports for the General Elliot Lake Area (10 reports reviewed)

. the OWRC report, 1972 E-1
  - oldest extensive environmental study

. the Elliot Lake EIS, Volumes 1, 2, 4, Appendix, 1977-1978
  - most recent and most extensive collection and interpretation of environmental information
  - focusses on studies conducted between 1976 and 1978

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Air Quality Assessment Studies Carried out in Elliot Lake Area 1976-1980

DATE: 1981

AUTHOR(S) : Ontario Ministry of Environment

SPONSOR(S) :

SITE(S) DISCUSSED : Elliot Lake

SITE STATUS :

REPORT TYPE :

REPORT OBJECTIVE(S): Air Quality monitoring

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Hi-vol sampling Dustfall Conc. radon Daughters	TSP, alpha, beta, radium 226, uranium	10+ locations	> 500

COMMENTS:

includes all air quality data collected by MOE, MOL, Rio Algom Ltd., Denison Mines Ltd. and J.F. MacLaren between 1976 and 1980

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : pH - Radium Surveys of Quirke Lake

DATE: 1979

AUTHOR(S) : Denison Mines Limited

SPONSOR(S) :

SITE(S) DISCUSSED : Quirke Lake

SITE STATUS :

REPORT TYPE :

REPORT OBJECTIVE(S): compendium of lake surveys 1969 - 1979

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Lake water	pH, radium (sometimes others)	up to 50 around the lake	200+

COMMENTS:

good summary of pH trends in Quirke Lake over this ten year period

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Mine Waste - Rock Survey

DATE: December 1978

AUTHOR(S) : Rio Algom

SPONSOR(S) :

SITE(S) DISCUSSED : All Rio Algom properties

SITE STATUS : various

REPORT TYPE : special study

REPORT OBJECTIVE(S): compendium of lake surveys 1969 - 1979

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
8 tailings areas	8 surveys	10 to 20 samples taken	
	sulphur content		
	acid generation potential		
	volumes, areas, of waste		

COMMENTS:

a complete survey of all tailings and waste rock on Rio Algom properties in 1976

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Serpent River Study Programme

DATE: 1976

AUTHOR(S) : L.S. Love and Associates Limited

SPONSOR(S) : Denison Mines

SITE(S) DISCUSSED : Serpent River Basin

SITE STATUS : some operating, some non-operating

REPORT TYPE : special study

REPORT OBJECTIVE(S): emission/effluent monitoring

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Sediments	Ra-226	various lakes and streams in the Serpent River Basin	55
Water quality	14 various chemical, physical and radionuclides	various lakes and streams in the Serpent River Basin	55

COMMENTS:

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Radio - Contaminants in Mine Waste Water

DATE: April 1973

AUTHOR(S) : MOE memo from J.R. Hawley

SPONSOR(S) :

SITE(S) DISCUSSED : several

SITE STATUS : operating and non-operating

REPORT TYPE : memo - special study

REPORT OBJECTIVE(S): characterize various effluents and seepages

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Effluents and seepage	up to 6 radionuclides uranium, pH, gross Alpha and Beta	16 sites in the Elliot Lake area	appears to be 1 at each location

sampling dates not specified. Sometime between 1966 and 1972

COMMENTS:

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Water Pollution From the Uranium Mining Industry in the Elliot Lake and Bancroft Areas Vol. 2 - Detailed Findings DATE: 1972

AUTHOR(S) : Ontario Water Resources Commission

SPONSOR(S) : Ontario Water Resources Commission

SITE(S) DISCUSSED : Elliot Lake and Bancroft areas

SITE STATUS : some operating, some non-operating

REPORT TYPE : special

REPORT OBJECTIVE(S): effluent monitoring and impact assessment

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Surface water quality	(16) various physical and chemical	80+ station in various lakes and streams	monthly
Sediments	radium, alpha, beta and uranium	various lakes and streams	33 samples
Surface water hydrology	flows	23 stations	continuous Oct 1/68 to Sept 30/69
Water and land uses	Industrial, domestic and recreational		
Geology-minerology		2 areas	mostly visual
Surface water biota	Zooplankton and chlorphyll 9 fauna, fish 4 radionuclides	various lakes and streams	

COMMENTS:

comprehensive report of monitoring undertaken during 1968 and 1969

ATTACHMENT B: Elliot Lake (Long Lake)

Priority Reports for Long Lake (5 reports reviewed)

. the OWRC report, 1971-1972	see E-1
. the Elliot Lake EIS, 1977-1978 - particularly Volumes 2 and 4 but also Volume 1 and Appendix 1	L-1, L-3 L-4, L-5
. a survey of sediment in the Serpent River D/S of Long Lake area	L-2

Note that Denison maintains records of all environmental data. The MOE data system includes the results from several stations near Long Lake. Monthly monitoring reports submitted by Denison have not been included in the review.

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Environmental Assessment of the Proposed Elliot Lake Uranium Mines Expansion - Addendum 1

DATE: September 1978

AUTHOR(S) : James F. MacLaren Limited

SPONSOR(S) : Denison and Rio Algom Limited

SITE(S) DISCUSSED : Long Lake

SITE STATUS : Operating

REPORT TYPE : Update

REPORT OBJECTIVE(S): Impact assessment

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Effluent	radium-226	1	2

COMMENTS:

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Environmental Assessment of the Proposed Elliot Lake Uranium Mines Expansion Vol. 4
Environmental Assessment DATE: April 1978
AUTHOR(S) : James F. MacLaren Limited
SPONSOR(S) : Denison Mines/Rio Algom

SITE(S) DISCUSSED : Long Lake

SITE STATUS : Operating

REPORT TYPE : EIS

REPORT OBJECTIVE(S): Impact assessment of expansion

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Air quality	TSP	(3) tailings	40+
	radon	tailings	6
Water quality	(4) physical, radiol. and chemical	tailings effluent	

COMMENTS:

Most numerical data was included in Volumes 2 and Addendum

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Environmental Assessment of the Proposed Elliot Lake Uranium Mines Expansion Vol. 2
Background Information Update DATE: February 1978
AUTHOR(S) : James F. MacLaren Limited
SPONSOR(S) : Denison Mines Ltd., Rio Algom Ltd.

SITE(S) DISCUSSED : Long Lake

SITE STATUS : Operational

REPORT TYPE : Special

REPORT OBJECTIVE(S): Environmental data interpretation

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Air quality	TSP		daily Sept. 2-20
Spill history	- no numerical data provided		
radioactivity	gamma radiation 70+ waist level readings		
Water quality	radionuclides (5)	tailings effluent	8
	radon daughters	over and near tailings	13

Estimate of dry exposed tailings surface area

A micro-met station at Long Lake tailings measuring wind speed and direction and atmospheric stability

- tailings radionuclide (10) analysis by class size (6)
- numerical data for particulates in MOE report "Air Quality Assessment Studies carried out in the Elliot Lake Area 1976-1980"

COMMENTS:

particulate and gamma information presented in graph form - no raw data

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Investigation for Radium Salt Deposits in the Serpent River Bed

DATE: December 1977

AUTHOR(S) : R. Webber

SPONSOR(S) : Denison Mines Ltd.

SITE(S) DISCUSSED : Serpent River and Long Lake

SITE STATUS : Operating

REPORT TYPE : Special - internal memo

REPORT OBJECTIVE(S):

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Sediment	radium-226	12 along river	18 in total

COMMENTS:

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Environmental Assessment of the proposed Elliot Lake Uranium Mines Expansion Vol. 1
Background Information DATE: March 1977

AUTHOR(S) : James F. MacLaren

SPONSOR(S) : Denison Mines/Rio Algom

SITE(S) DISCUSSED : Long Lake

SITE STATUS : Operating

REPORT TYPE : EIS

REPORT OBJECTIVE(S): Review of historical information

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Water quality	(6) radionuclide chemical and physical	effluent discharge	

COMMENTS:

- in graph form. No numerical data estimates of radioactivity delivered to tailings areas.

ATTACHMENT B: Elliot Lake (Panel)

Priority Reports for Panel (4 reports reviewed)

. a brief study of dormant tailings, 1974 - undertaken by Rio Algom	P-1
. the Elliot Lake EIS, 1977-1978 - Volumes 1, 2, and 4	P-2, P-3, P-4

Note that this property has since come back into production. Both, Rio Algom and MOE have computerized data systems that include results from the Panel area.

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Environmental Assessment of the proposed Elliot Lake Uranium Mines Expansion Vol. 4
Environmental Assessment DATE: April 1978

AUTHOR(S) : James F. MacLaren Ltd.

SPONSOR(S) : Denison Mines/Rio Algom

SITE(S) DISCUSSED :

SITE STATUS :

REPORT TYPE : EIS

REPORT OBJECTIVE(S):

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Air quality	TSP	(2) tailings	7
Water quality	(4) chemical radiol. and physical	tailings effluent	

COMMENTS:

numerical data in volume 2

P-3

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Environmental Assessment of the proposed Elliot Lake Uranium Mines Expansion Vol. 2 Update and Information DATE: February 1978
AUTHOR(S) : James F. MacLaren Ltd.
SPONSOR(S) : Denison Mines Ltd., Rio Algom Ltd.

SITE(S) DISCUSSED : Panel

SITE STATUS : non-operating

REPORT TYPE : EIS

REPORT OBJECTIVE(S): update

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Air Quality	TSP		varies August 13-31
Radioactivity	gamma radiation	50+ waist level readings	
Water quality	radionuclides (5)	Panel tailings effluent	8

Estimate of dry exposed tailings surface area

Spill history - no numerical data provided

- numerical data for particulates in MOE report "Air Quality Assessment Studies Carried Out in the Elliot Lake area 1976 - 1980"

COMMENTS:

particulate and gamma radiation presented in graph form
- no raw data

P-2

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Environmental Assessment of the proposed Elliot Lake Uranium Mines Expansion Vol. 1 Background Information DATE: March 1977
AUTHOR(S) : James F. MacLaren Ltd.
SPONSOR(S) : Denison Mines/Rio Algom

SITE(S) DISCUSSED : Elliot Lake (Panel)

SITE STATUS :

REPORT TYPE :

REPORT OBJECTIVE(S):

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Water quality	(6) radionuclide chemical and physical	effluent discharge	

COMMENTS:

- in graph form - no numerical data

estimates of radioactivity delivered to tailings areas

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Flooded Tailings Samples

DATE: March 1977

AUTHOR(S) : J. Wellard

SPONSOR(S) : Rio Algom

SITE(S) DISCUSSED : Strike Lake

SITE STATUS : non-operating

REPORT TYPE : internal memo

REPORT OBJECTIVE(S):

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Tailings	pH, Emf radium	appears to be 15	each sampled once

COMMENTS:

ATTACHMENT B: Elliot Lake (Quirke)

Priority Reports for Quirke (5 reports reviewed)

. the OWRC report, 1971 - 72	see E-1
. the Elliot Lake EIS	Q-1, Q-2 Q-3, Q-5

Note that Rio Algom has a computerized data system that has most Quirke data back to 1975 (?) and the MOE has a similar system for water quality data

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Environmental Assessment of the Proposed Elliot Lake Uranium Mine Expansion Addendum 1

DATE: September 1978

AUTHOR(S) : James F. MacLaren Ltd.

SPONSOR(S) : Denison Mines/Rio Algom

SITE(S) DISCUSSED : Quirke (Quirke I and New Quirke)

SITE STATUS : operating

REPORT TYPE : EIS

REPORT OBJECTIVE(S): update

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Water quality	several radionuclides	effluent and D/S	10

COMMENTS:

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Control of Radium-226 Releases in Liquid Effluents

DATE: July 1978

AUTHOR(S) : D. Moffett and A. Vivyurka

SPONSOR(S) : Rio Algom Ltd.

SITE(S) DISCUSSED : Quirke

SITE STATUS : operating

REPORT TYPE : special study

REPORT OBJECTIVE(S): effluent treatment

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Effluent	radium-226 (total and dissolved)	3	daily for ~ 45 days

COMMENTS:

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Environmental Assessment of the Proposed Elliot Lake Uranium Mines Expansion Vol. 4
Environmental Assessment DATE: April 1978
AUTHOR(S) : James F. MacLaren Ltd.
SPONSOR(S) : Denison Mines/Rio Algom

SITE(S) DISCUSSED : Quirke and New Quirke

SITE STATUS : operating

REPORT TYPE : EIS

REPORT OBJECTIVE(S): environmental impact assessment

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Air quality	TSP	(3) tailings	60+
	radon	tailings	7
Water quality	(4) radiol. chemical and physical	tailings effluent	

COMMENTS:

numerical data in volume 2

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Environmental Assessment of the Proposed Elliot Lake Uranium Mines Expansion Vol. 2

DATE: February 1978

AUTHOR(S) : James F. MacLaren Ltd.

SPONSOR(S) : Denison Mines Ltd., Rio Algom Ltd.

SITE(S) DISCUSSED : Quirke

SITE STATUS : operating

REPORT TYPE : EIS

REPORT OBJECTIVE(S): environmental impact assessment

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Air Quality	TSP		varies June 21 - Sept 9
Spill history	- no numerical data provided		
radioactivity	gamma radiation	50+ waist level readings	
Water quality	radionuclides (11)	Quirke tailings effluent	95+
Sediment	radionuclides (5)		8
Tailings	radionuclide by size class (6 classes) (8 radionuclide) radon daughters	 near and over tailings	 9

estimate of dry exposed tailings surface area

- numerical data for particulates in MOE report "Air Quality Assessment Studies Carried Out in the Elliot Lake Area 1976 - 1980"

COMMENTS:

particulate and gamma information presented in graph form - no raw data

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Environmental Assessment of the Proposed Elliot Lake Uranium Mines Expansion Vol. 1, Background Information DATE: March 1977

AUTHOR(S) : James F. MacLaren

SPONSOR(S) : Denison Mines/Rio Algom

SITE(S) DISCUSSED : Quirke

SITE STATUS : operating

REPORT TYPE : EIS

REPORT OBJECTIVE(S): review of historical data

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Water quality	(6) radionuclide chemical and physical	effluent discharge	
Air quality	radon daughters	tailings area (3)	3

COMMENTS:

in graph form - no numerical data

estimate of radioactivity delivered to Tailings area

ATTACHMENT B: Elliot Lake (Others)

Priority Reports for Other Elliot Lake Areas (7 reports reviewed)

. a brief study of dormant tailings, 1974 - this work by Rio Algom investigated some key factors of dormant tailings	O-1
. the Elliot Lake EIS, 1977 - 1978 - particularly useful are Volume 2 and Appendix 1, although Volumes 1 and 4 may also have unique information	O-2, O-3 O-4, O-5

Both the MOE and the companies maintain computerized data bases they include the results from stations at all of these areas.

O-7

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Environmental Studies At The Lacnor-Nordic Tailings Area

DATE: March 1979

AUTHOR(S) : James F. MacLaren Limited

SPONSOR(S) : Rio Algom Limited

SITE(S) DISCUSSED : Lacnor-Nordic

SITE STATUS : non-operating

REPORT TYPE : special study

REPORT OBJECTIVE(S): water management/treatment study

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Effluent	pH, radium-226, iron, flow	3 stations	monthly from Jan 76 to Sept 78

COMMENTS:

Little new data, reports E-5, 6 have same data

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Environmental Studies At The Pronto Mine Tailings Area

DATE: December 1978

AUTHOR(S) : James F. MacLaren Limited

SPONSOR(S) : Rio Algom Limited

SITE(S) DISCUSSED : Pronto

SITE STATUS : non-operating

REPORT TYPE : special study

REPORT OBJECTIVE(S): water management treatment study

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Effluent quality	flow, pH, iron, radium-226, acidity	up to 4 stations	monthly for three years (Jan 76 to Oct 78)
Sediment	radium-226	11 stations	sampled once

COMMENTS:

same data presented in Elliot Lake EIS

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Environmental Assessment of the Proposed Elliot Lake Uranium Mine Expansion, Addendum 1

DATE: September 1978

AUTHOR(S) : James F. MacLaren Limited

SPONSOR(S) : Denison Mines/Rio Algom

SITE(S) DISCUSSED : Crotch Lake, Nordic, Stanrock

SITE STATUS : non-operating

REPORT TYPE : update

REPORT OBJECTIVE(S): environmental data presentation

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Air Quality	dust fall	3 at Stanrock	Weekly - Aug 76 to Mar 78
		2 at Nordic	150 during 1977 and 1978
Water Quality	several radionuclides	3 locations at Crotch	1
Biology	gross Alpha and Beta levels in various species and some radionuclides	many including Crotch, Nordic and Stanrock tailings	many

COMMENTS:

Summarizes air quality data presented in E-10
Other data may be unique to this report

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Environmental Assessment of the Proposed Elliot Lake Uranium Mines Expansion Vol. 4, Environmental Assessment DATE: April 1978

AUTHOR(S) : James F. MacLaren Limited

SPONSOR(S) : Denison Mines/Rio Algom

SITE(S) DISCUSSED : Crotch Lake, Nordic, Pronto, Stanrock, Strike Lake

SITE STATUS : all non-operating

REPORT TYPE : EIS

REPORT OBJECTIVE(S): environmental impact assessment

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Air quality	TSP	tailings (3)	90
	radon	tailings	1
Water quality	(4) physical, radiol. and chemical	tailings effluent	

COMMENTS:

air quality data found in Vol. 2 of the EIS (E-5) or E-10

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Environmental Assessment of the Proposed Elliot Lake Uranium Mines Expansion Vol. 2, Background Information DATE: February 1978

AUTHOR(S) : James F. MacLaren Limited

SPONSOR(S) : Denison Mines Ltd., Rio Algom Ltd.

SITE(S) DISCUSSED : Crotch, Nordic, Stanrock, Strike, Pronto, Olive

SITE STATUS : dormant

REPORT TYPE : special study

REPORT OBJECTIVE(S):

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Air Quality	TSP	stations at Nordic,	daily June 10-July 12
Air Quality	TSP	Stanrock and Crotch	varies June 10-Aug 26
	Respirable Particulate		May 27-June 27 daily
Spill history	- no numerical data provided		
Radioactivity	gamma radiation	100+ waist level readings at Crotch, Nordic, Stanrock, Panel, Pronto	

Micro-met stations set up at Stanrock, Nordic and Crotch for 1 to 2 months for wind, speed and direction and atmospheric stability

Estimates of dry exposed tailings surface area

tailings - radionuclides analysis by class, size (6 classes) (11 radionuclide) for Stanrock and Nordic

(numerical data for particulates in MOE report "Air Quality Assessment studies carried out in the Elliot Lake Area 1976 - 1980")

COMMENTS:

Particulate and gamma information presented in graph form - no raw data shown

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Environmental Assessment of the Proposed Elliot Lake Uranium Mines Expansion Vol. 1,
Background Information DATE: March 1977
AUTHOR(S) : James F. MacLaren Limited
SPONSOR(S) : Denison Mines Ltd., Rio Algom Ltd.

SITE(S) DISCUSSED : Crotch, Nordic, Stanrock, Panel, Pronto, Olive

SITE STATUS : dormant

REPORT TYPE : special study

REPORT OBJECTIVE(S): review of historical information

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements

Comprehensive review of historical data for water quality, meteorology, effluents, aquatic biology, operating histories, tailings management systems.

General Elliot Lake area includes 20 air quality stations 40 water quality stations 6 aquatic biology stations etc., each of which has been sampled at different frequencies for different durations. This report presents "averages" or "typical" values derived largely from raw data from the companies and MOE.

COMMENTS:

CANUT BIBLIOGRAPHIC DATA SHEET

TITLE : Flooded Tailings Samples

DATE: October 10, 1974

AUTHOR(S) : J. Wellard

SPONSOR(S) : Rio Algom

SITE(S) DISCUSSED : Crotch Lake, Olive Lake

SITE STATUS : non-operating

REPORT TYPE : internal memo

REPORT OBJECTIVE(S): analyses of tailings characteristics

INFORMATION PRESENTED:

Media	Parameters	Sampling Locations	# of Measurements
Tailings core	pH, Emf, Fe	(4) dry - flooded	20+
	Radium	flooded tailings and below watertable	

COMMENTS:

one of the only sources of Olive Lake data

ATTACHMENT C: Public Data Source Bibliography from Golder Associates

BREAKDOWN OF INFORMATION SOURCES

NUTP CANUT DATABASE

Mining Company	Tailings Area	No. of Reports Technical Publications	No of Reports/ Technical Publications Released by Mining Company For Use in Database
Rio Algom Limited	Panel	38	20
	Stanleigh	51	16
	Pronto	4	0
	Quirke	49	36
	Nordic	14	3
	Sheriff Creek	3	0
	Genera	12	6
Denison Mines Limited	Denison	99	N.R.
	Stanrock	17	N.R.
Lac Minerals Ltd.	Bicroft	4	N.R.
Amok Ltd.	Cluff Lake	20	N.R.
Eldor Mines	Rabbit Lake/ Wollaston Lake	13	4
Eldorado Resources Limited	Meadow Lake/ Ace Creek/ Beaver Lodge	12	8
Key Lake Mining Corporation	Key Lake	2	N.R.
GENERAL		2	2

NOTE: N.R.: No Response from the company.

TABLE 1
GEOTECHNICAL INFORMATION SOURCES
NUTP CANUT DATABASE

TAILINGS AREA	REPORT DATE (mo/yr)	TITLE	DATA CATEGORY	COMPANY/ AUTHOR	REPORT NO.	PRIORITY	PUBLIC INFO	DOCUMENT SIZE					
								PAGES	FIGURES	TABLES	APPND'S	BOREHOLES	TEST PITS
Panel Mine Elliot Lake, Ontario	1/73	Report to Rio Algom Limited Diversion Structure Strike Lake Disposal Area Preliminary Investigation	3 5*	Golder	72159	C	Yes	6	3	Yes	-	52	-
	11/77	Report to Rio Algom Limited Geotechnical Investigation Strike Lake Tailings Impoundment Contract 230 A 13, Vol. II	2* 3 5*	Golder	771031	A	Yes	38	43	No	-	22	-
	11/77	Report to Rio Algom Limited Vol. I: Site Selection & Recommended Deposition Scheme	3 4	MacLaren		B	Yes	43	9	Yes	-	-	-
	2/78	Report to Rio Algom Limited Vol III: Design Brief, Construction of 1978 Facilities	2 3 4	Golder/ MacLaren	771066 Y	A	Yes	36	6	Yes	-	-	-
	2/78	Report to Rio Algom Limited Geotechnical Aspects Proposed Drainage Diversion North of Strike Lake Panel Mine Rehabilitation	3 5*	Golder	771066 Y	B	Yes	11	4	Yes	-	-	-
	2/78	Report to Rio Algom Limited Geotechnical Design Report Dam B - Strike Lake Tailings Management Area	3	Golder	771066 B	B	Yes	18	8	No	-	-	-
	2/78	Report to Rio Algom Limited Geotechnical Design Report Dam D Strike Lake Tailings Management Area	3	Golder	771066 D	B	Yes	18	9	No	-	-	-
	3/78	Request for Proposals Cut-off Trench Dewatering Dam B	2* 3 5*	Golder	771066	A	Yes	31	14	No	-	9	-
	5/78	Report to Rio Algom Limited Preliminary Appraisal Dam M Alternatives South Tailings Area	2* 3 4 5*	Golder	771066 M	A	Yes	11	3	Yes	-	2	-
	5/78	Report to Rio Algom Limited Geotechnical Design Dam A South Tailings Management Area	3 4	Golder	771066 A	B	Yes	11	5	No	-	-	-
	6/78	Report to Rio Algom Limited Geotechnical Design of Dam F South Tailings Area	3 4	Golder	771066 F	B	Yes	15	7	No	-	-	-

* contains field data

TABLE 1
GEOTECHNICAL INFORMATION SOURCES
NUTP CANUT DATABASE

TAILINGS AREA	REPORT DATE (mo/yr)	TITLE	DATA CATEGORY	COMPANY/ AUTHOR	REPORT NO.	PRIORITY	PUBLIC INFO	DOCUMENT SIZE					
								PAGES	FIGURES	TABLES	APPND'S	BOREHOLES	TESTPITS
Panel Mine Elliot Lake, Ontario	6/78	Report to Rio Algom Limited Vol. IV: Basin Permeability Study Strike Lake Tailings Impoundment Contract 230 A 23	1 2 4	Golder/ MacLaren	781065	A	Yes	45	16	Yes	1	-	-
	6/78	Report to Rio Algom Limited Vol. IV: (i) Ground and Surface Water Quality Monitoring Program (ii) Estimated Release of Pollutants at Abandonment (iii) Basin Permeability Study	1 2 4	Golder/ MacLaren	781065	A	Yes	45	16	Yes	1	-	-
	11/78	Report to Rio Aglom Limited Alternative Geotechnical Design Dams A and F South Tailings Management Area	3	Golder	771066	B	Yes	5	2	No	-	-	-
	12/78	Report to Rio Algom Limited Vol. V Preliminary Design Brief Effluent Treatment Facilities	3	MacLaren	10957-5	B	Yes	8	1	Yes	-	-	-
	3/79	Report to Rio Algom Limited Contract 230 A 17 Berms M1 and M2	3	Golder	771066 M	B	Yes	4	3	No	-	-	-
	4/79	Report to Rio Algom Limited Suggested Tailings Disposal Concept Contract 230 A 17	2 3	Golder/ MacLaren	771066 P	A	Yes	31	12	Yes	1	-	-
	4/79	Report to Rio Algom Limited Supplementary Data Strike Lake Tailings Impoundment Contract 230 A 10	2* 5*	Golder	771031-1	A	Yes	9	35	Yes	-	13	7
	5/79	Report to Rio Algom Limited Vol. VI: (1) Tailings Deposition Scheme (2) Details of Tailings Effluent Treatment System	3 4	Golder/ MacLaren	771066-P	B	Yes	29	12	Yes	1	-	-
	9/82	"Uranium Tailings Design and Management Practices at Elliot Lake, Ontario", International Conference on Radioactive Waste Management, Winnipeg, Canada	4	J.B.Davis K.B.Culver P.F.Pullen	Technical Paper	C	Yes	8	4	No	-	-	-

* contains field data

TABLE 2
GEOTECHNICAL INFORMATION SOURCES
NUTP CANUT DATABASE

TAILINGS AREA	REPORT DATE (mo/yr)	TITLE	DATA CATEGORY	COMPANY/ AUTHOR	REPORT NO.	PRIORITY	PUBLIC INFO	DOCUMENT SIZE					
								PAGES	FIGURES	TABLES	APPND'S	BOREHOLES	TESTPITS
Stanleigh Mine Elliot Lake, Ontario	6/79	Report to Preston Mines Limited Vol. 1 - Site Selection and Recommended Deposition Scheme	3 4	Goldar/ MacLaren	791-1027/ 11505-0	B	Yes	55	18	Yes	-	-	-
	5/80	Report to Rio Algom Limited Description, Plans and Specifications of the Water Supply System, Tailings System and Water Diversion System	2 3 4	MacLaren	11839-0	B	Yes	11	13	Yes	-	-	-
	6/80	Report to Rio Algom Limited Vol. 3 - Hydrogeological Assessment of the Tailings Impoundment Basin, Part 'A' - Factual Results of Geological and Hydrogeological Studies	2* 3 4	Golder	791-1200	A	Yes	74	30	Yes	30	33	-
	7/80	Report to Rio Algom Limited Update of Hydrological/Hydraulic Aspects of Rye-Strouth Water Supply System	3 4	MacLaren	11565-2	B	Yes	9	1	No	-	-	-
	10/80	Report to Rio Algom Limited Vol. 3 - Hydrogeological Assessment of the Tailings Impoundment Basin, Part 'B' - Assessment of Potential Flow Paths and Seepage Quantities from Tailings Impoundment Basin.	2 4	Golder	791-1259	A	Yes	71	15	Yes	3	-	-
	12/80	Report to Rio Algom Limited Vol. 3 - Hydrogeological Assessment of the Tailings Impoundment Basin, Part 'C' - Assessment of Impact of Potential Seepage on Surrounding Environment	1* 2* 4	Golder/ MacLaren	801-1215	A	Yes	56	12	Yes	1	-	-
	2/81	Report to Rio Algom Limited Vol. 5 - Design Brief	2* 3	Golder/ MacLaren	791-1027/ 11505-1	A	Yes	25	7	Yes	1	-	-
	2/81	Report to Rio Algom Limited Geotechnical Investigation and Design, Dams 9 and 10, Tailings Management Area	3 5*	Golder	791-1347-0	B	Yes	16	17	No	1	9	-
	2/81	Report to Rio Algom Limited E.W.P. C-C-305, Rev. B, Dam 9 E.W.P. C-C-306, Rev. B, Dam 10 Scope of Work and Technical Specification for Regulatory Approval, Area 720 - Tailings Dams, Stanloigh Project 231	3	Golder	801-1021	B	Yes	29	8	Yes	-	-	-

* contains field data

TABLE 2
GEOTECHNICAL INFORMATION SOURCES
NUTP CANUT DATABASE

TAILINGS AREA	REPORT DATE (mo/yr)	TITLE	DATA CATEGORY	COMPANY/ AUTHOR	REPORT NO.	PRIORITY	PUBLIC INFO	DOCUMENT SIZE: PAGES	FIGURES	TABLES	APPND'S	BOREHOLES	TEST PITS
Stanleigh Mine Elliot Lake, Ontario	3/81	Report to Rio Algom Limited E.W.P. C-C-308 Dam A Embankment Construction E.W.P. C-C-310 Dam A Foundation Excavation, Scope of Work and Technical Specifications for Regulatory Approval, Area 720 - Tailings Dams, Stanleigh Project 231	3	Golder	801-1021	B	Yes	41	11	Yes	-	-	-
	3/81	Report to Rio Algom Limited Geotechnical Investigation and Design, Dam A, Tailings Management Area	2* 3 5*	Golder	791-1347-7	A	Yes	22	30	No	1	18	-
	3/81	Report to Rio Algom Limited Geotechnical Investigation and Design, Dam B, Tailings Management Area	2* 3 5*	Golder	791-1347-8	A	Yes	9	7	No	-	4	-
	3/81	Report to Rio Algom Limited Stanleigh Project 231, Area 720, Tailings Impoundment, Dam B, Concrete Spillway	3	MacLaren	11505-2	C	Yes	14	1	No	-	-	-
	5/81	Report to Rio Algom Limited Geotechnical Investigation, Contract 231 A 15, Stanleigh Mine Water Supply and Tailings Management Scheme	2* 5*	Golder	791-1192	A	Yes	43	87	Yes	1	77	7
	5/82	"Hydrogeologic Investigations and Evaluation of the Stanleigh Mine Tailings Impoundment Site", International Symposium on Management of Wastes from Uranium Mining and Milling, Albuquerque, New Mexico	2 4	J.H.Boyd, T.G.Carter, R.A.Knapp, K.B.Culver	Technical Paper	B	Yes	17	4	Yes	-	-	-
	11/82	Report to Rio Algom Limited As-Built Report, Dams A and B - Stage 1, Crotch Lake Tailings Management Scheme	3	Golder	811-1326	B	Yes	20	29	Yes	2	-	-

* contains field data

TABLE 3
GEOTECHNICAL INFORMATION SOURCES
NUTP CANUT DATABASE

TAILINGS AREA	REPORT DATE (mo/yr)	TITLE	DATA CATEGORY	COMPANY/ AUTHOR	REPORT NO.	PRIORITY	PUBLIC INFO	DOCUMENT SIZE					
								PAGES	FIGURES	TABLES	APPND'S	BOREHOLES	TEST PITS
Quirke Mine Elliot Lake, Ontario	8/77	Report to Rio Algom Limited Subsurface Investigation Proposed Evans Lake Protection Quirke Mine Tailings Disposal Area - (Contract 223 A61)	3 5*	Golder	771139	B	Yes	9	7	No	-	6	-
	3/78	Report to Rio Algom Limited Geotechnical Investigation Existing Quirke Mine Tailings Management Area, Vol. I Stability/Seepage Conditions; Perimeter Containment Dams and Treatment Facilities	1 2* 3 5*	Golder	771051	A	Yes	36	38	Yes	4	21	-
	1978	Report to Rio Algom Limited Seismic Risk at Elliot Lake	3	Weston Geophysical Research Inc.		B	Yes	24	8	Yes	1	-	-
	5/79	"Control of Seepage From Uranium Mill Tailings Ponds in the Elliot Lake Mining Area", Proc. 1st International Mine Drainage Symposium, Denver, Colorado	3 4	J.B.Davis R.A.Knapp K.W. Sinclair	Technical Paper	C	Yes	30	19	Yes	-	-	-
	7/79	Report to Rio Algom Limited Vol. I - 1972 - 1982 Internal Development Program	3 4	Golder/ MacLaren	781300	B	Yes	15	8	3	1	-	-
	7/79	Letter to Rio Algom Limited Evans Lake Control Dam	3	Golder	781300	C	Yes	3	1	No	-	-	-
	11/79	Report to Golder Associates Cyclic Strength of Undisturbed Sand Tailings - Quirke Mine Tailings Management Area	3 4	Dr.Marshall L.Silver	771051	B	Yes	40	No	Yes	1	-	-
	2/80	Vol. II - Site Selection Report	3 4	Golder/ MacLaren	11578-0	C	Yes	44	14	Yes	2	-	-

* contains field data

TABLE 3

GEOTECHNICAL INFORMATION SOURCES
NUTP CANUT DATABASE

TAILINGS AREA	REPORT DATE (mo/yr)	TITLE	DATA CATEGORY	COMPANY/ AUTHOR	REPORT NO.	PRIORITY	PUBLIC INFO	DOCUMENT SIZE					
								PAGES	FIGURES	TABLES	APPND'S	BOREHOLES	TESTPITS
Quirke Mine Elliot Lake, Ontario	8/80	Report to Rio Algom Limited Quirke Tailings Management Area Development Plan 1979 - 1990	3	MacLaren	11578	B	Yes	4	3	Yes	-	-	-
	8/80	Report to Rio Algom Limited Geotechnical Investigation and Design Recommendations - Lake C Diversion Scheme (Dam H and Diversion Channel)	3 5*	Golder	801-1089-1	B	Yes	22	38	Yes	3	6	4
	12/80	Report to Rio Algom Limited Vol. III - Design Brief	2 3	Golder/ MacLaren	11578-1	B	Yes	40	17	Yes	2	-	-
	1/81	Report to Rio Algom Limited Geotechnical Investigation and Design Recommendations, Dam J	2* 3 5*	Golder	801-1089-2	A	Yes	50	34	Yes	6	13	3
	1/81	Report to Rio Algom Limited Geotechnical Investigation and Design Recommendations - Evans Lake Diversion Channel	3 5*	Golder	801-1089-3	B	Yes	7	4	No	No	3	-
	2/81	Report to Rio Algom Limited Geotechnical Investigation and Design Recommendations, Dam I	2* 3 5*	Golder	801-1089-4	A	Yes	45	29	Yes	5	5	16
	2/81	Report to Rio Algom Limited Geotechnical Investigation and Design Recommendations, Dam G_1	2* 3 5*	Golder	801-1089-5	A	Yes	45	27	Yes	6	9	11
	2/81	Report to Rio Algom Limited Vol. IV - Hydrogeological Assessment of The Tailings Impoundment Basin	2* 4	Golder/ MacLaren	801-1087	A	Yes	72	22	Yes	1	-	-
	2/81	Interim Report to Rio Algom Limited Quirke Tailings Impoundment Seepage Analysis	1 2	MacLaren	01826-0	A	Yes	11	1	Yes	-	-	-
	4/81	Foundation Bedrock Grouting Design Brief, Dams G, I and J	3	Golder	801-1089-11	B	Yes	39	81	Yes	5	36	35
	5/81	Report to Rio Algom Limited Borrow Materials Investigation	5*	Golder	801-1051-4	C	Yes	39	82	Yes	5	37	36

* contains field data

TABLE 3
GEOTECHNICAL INFORMATION SOURCES
NUTP CANUT DATABASE

TAILINGS AREA	REPORT DATE (mo/yr)	TITLE	DATA CATEGORY	COMPANY/ AUTHOR	REPORT NO.	PRIORITY	PUBLIC INFO	DOCUMENT SIZE					
								PAGES	FIGURES	TABLES	APPND'S	BOREHOLES	TESTPITS
Quirke Mine Elliot Lake, Ontario	5/81	Report to Rio Algom Limited Geotechnical Recommendations - Dam J, Addendum A	3	Golder	801-1089-2A	B	Yes	6	3	No	-	-	-
	5/81	Report to Rio Algom Limited Geotechnical Investigation and Design Recommendations - East Dyke Spillway and Culverts	2* 3 5*	Golder	801-1089-9	A	Yes	13	7	No	-	3	-
	6/81	Report to Rio Algom Limited Stability of the East Dyke	2* 3 5*	Golder	801-1089-12	A	Yes	28	17	Yes	2	8	-
	9/81	Report to Rio Algom Limited Geotechnical Investigation and Design Recommendations, Dam G_2	2* 3 5*	Golder	801-1089-6	A	Yes	43	29	Yes	7	30	-
	9/81	Report to Rio Algom Limited Geotechnical Investigation and Design Recommendations, Dam K_1	2* 3 5*	Golder	801-1089-7	A	Yes	44	27	Yes	6	20	-
	9/81	Report to Rio Algom Limited Geotechnical Investigation and Design Recommendations, Dam K_2	2 3 5*	Golder	801-1089-8	A	Yes	41	22	Yes	5	3	1
	10/81	Report to Rio Algom Limited Geotechnical Investigation and Design Recommendations, Dam L	2* 3 5*	Golder	801-1089-10	A	Yes	45	33	Yes	6	13	7
	11/81	Report to Rio Algom Limited Foundation Bedrock Grouting Design Brief, Dams G_2, K_1, K_2, and L	3	Golder	801-1089-13	B	Yes	16	12	Yes	-	-	-
	12/81	Report to Rio Algom Limited Geotechnical Investigation and Design Recommendations Berm M, Quirke Tailings Bain Expansion (Contract MP-0001, Project 262)	3 5*	Golder	811-1090-1	B	Yes	7	6	No	1	1	-
	1/82	Vol. V Design Brief Update	3	MacLaren	11578-2	B	Yes	16	4	-	-	-	-
	8/82	Report to Rio Algom Limited As-Built Report 1981 Construction Dams J (Stage I), I and G_1	3 5	Golder	811-1325	B	Yes	24	35	Yes	3	-	-
	10/82	Hydrogeological Re-assessment of West End of Tailings Basin	1* 2* 3 4 5*	Golder/ Senes	821-1163 (821-1245, 821-1251 & 821-1162)	A	Yes	33	18	No	4	8	-

* contains field data

TABLE 3
GEOTECHNICAL INFORMATION SOURCES
NUTP CANUT DATABASE

TAILINGS AREA	REPORT DATE (mo/yr)	TITLE	DATA CATEGORY	COMPANY/ AUTHOR	REPORT NO.	PRIORITY	PUBLIC INFO	DOCUMENT SIZE PAGES	FIGURES	TABLES	APPND'S	BOREHOLES	TESTPITS
Quirke Mine Elliot Lake, Ontario	12/82	Report to Rio Algom Limited Evaluation of Existing Effluent Treatment Ponds	1* 3	Golder/ Senes	821-1181	A	Yes	36	19	Yes	2	18	-
	3/83	Report to Rio Algom Limited As-Built Report, 1982 Construction Dams K_1, and L	3 5	Golder	821-1245	B	Yes	13	4	Yes	40	-	-
	5/83	Report to Rio Algom Limited Proposed Dam Instrumentation	4	Golder	821-1161	C	Yes	18	18	Yes	-	-	-
	8/83	Report to Rio Algom Limited Proposed Dam Instrumentation (Construction Drawings)	-	Golder	821-1161-1	C	Yes	-	26	-	-	-	-
	1/84	Report to Rio Algom Limited As-Built Report, 1983 Construction Dams K_2, G_2, and J (Stage 2)	2 3 5	Golder	831-1234	A	Yes	42	36	Yes	1	-	-

* contains field data

TABLE 4
GEOTECHNICAL INFORMATION SOURCES
NUTP CANUT DATABASE

TAILINGS AREA	REPORT DATE (mo/yr)	TITLE	DATA CATEGORY	COMPANY/ AUTHOR	REPORT NO.	PRIORITY	PUBLIC INFO	DOCUMENT SIZE					
								PAGES	FIGURES	TABLES	APPND'S	BOREHOLES	TESTPITS
Nordic Mine Elliot Lake, Ontario	3/79	Report to Rio Algom Limited Environmental Studies at the Lacnor - Nordic Tailings Area	1 3 4	MacLaren	11225-0	A	yes	31	12	Yes	-	-	-
	5/80	"Groundwater Monitoring and Contaminant Occurrence at an Abandoned Tailings Area, Elliot Lake, Ontario", Proc. 1st International Conference on Uranium Mine Waste Disposal, Vancouver, British Columbia	1 2* 4	R.D.Blair J.A.Cherry T.P.Lim A.J. Vivyurka	Technical Paper	A	Yes	34	14	Yes	-	-	-
	5/82	"Hydrogeochemical Evolution of an Inactive Pyritic Uranium Tailings Basin And Retardation of Contaminant Migration in a Surrounding Aquifer" International Symposium on Management of Wastes from Uranium Mining and Milling, Albuquerque, New Mexico	1 4	N.K.Dave T.P.Lim A.J. Vivyurka N.Dubrovsky K.A.Morin D.J.A.Smyth R.W.Gillham J.A.Cherry	Technical Paper	A	Yes	15	6	No	-	-	-

* contains field data

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TABLE 5
GEOTECHNICAL INFORMATION SOURCES
NUTP CANUT DATABASE

TAILINGS AREA	REPORT DATE (mo/yr)	TITLE	DATA CATEGORY	COMPANY/ AUTHOR	REPORT NO.	PRIORITY	PUBLIC INFO	DOCUMENT SIZE PAGES	FIGURES	TABLES	APPND'S	BOREHOLES	TESTPITS
General Reports Elliot Lake, Ontario	3/77	Guidelines and Criteria for Approval Under the Lakes and Rivers Improvement Act	1 2 3	M.N.R.		A	Yes	64	4	-	-	-	-
	5/82	"Close-Out Concepts for the Elliot Lake Uranium Mining Operations", International Symposium of Management of Wastes from Uranium Mining and Milling, Albuquerque, New Mexico	3 4	K.B.Culver, J.L. Chakravatti, D.M.Gorber, R.A.Knapp, J.B.Davis	Technical Paper	C	Yes	12	1	Yes	-	-	-
	5/82	"Implications of Alternative Geochemical Controls on the Temporal Behaviour of Elliot Lake Tailings", International Symposium on Management of Wastes from Uranium Mining and Milling, Albuquerque, New Mexico	1 4	W.J. Snodgrass, D.L.Lush, J. Capobianco	Technical Paper	A	Yes	24	5	Yes	-	-	-
	5/82	"Development of a Precipitation and Filtration Process for Radium - 226 Removal". International Symposium on Management of Wastes from Uranium Mining and Milling, Albuquerque, New Mexico	1 4	D.Moffett, R.T.Webber E.Barnes	Technical Paper	A	Yes	12	5	Yes	-	-	-
	9/82	"Foundation Grouting Beneath Uranium Tailings Dams in Elliot Lake, Ontario", Proc. 35th Canadian Geotechnical Conference	2 3 4	B.T.Rogers C.F.King, D.E.Welch	Technical Paper	B	Yes	21	9	Yes	-	-	-
	9/82	"Design and Construction of Zoned Earthfill Dams in Elliot Lake, Ontario", Proc. 35th Canadian Geotechnical Conference	3 4	D.W.Reades D.P.A.Mangan J.K.Balins H.M.Goldby	Technical Paper	B	Yes	21	9	Yes	-	-	-

* contains field data

TABLE 7
GEOTECHNICAL INFORMATION SOURCES
NUTP CANUT DATABASE

TAILINGS AREA	REPORT DATE (mo/yr)	TITLE	DATA CATEGORY	COMPANY/ AUTHOR	REPORT NO.	PRIORITY	PUBLIC INFO	DOCUMENT SIZE					
								PAGES	FIGURES	TABLES	APPND'S	BOREHOLES	TESTPITS
General	1976	Tailings Disposal-Recommendations for Site Selection		Pollution Control Branch, M.O.E. Province of Ontario			Yes						
	11/80	"Contaminant Migration in Seepage From Uranium Mill Tailings Impoundments. An Overview." Proc. 3rd Symposium on Uranium Tailings Management		T.A. Shepherd, J.A.Cherry	Technical Paper		Yes						

* contains field data

TABLE 8
GEOTECHNICAL INFORMATION SOURCES
NUTP CANUT DATABASE

TAILINGS AREA	REPORT DATE (mo/yr)	TITLE	DATA CATEGORY	COMPANY/ AUTHOR	REPORT NO.	PRIORITY	PUBLIC INFO	DOCUMENT SIZE					
								PAGES	FIGURES	TABLES	APPND'S	BOREHOLES	TEST PITS
Rabbit Lake Operation, Wollaston Lake, Saskatchewan	1980	Geotechnical Study, Proposed Tailings Management Area, Collins Bay "B" Zone Orebody Development	3* 4 5	Geocon (1975) Ltd.	V8457	B	Yes	25	1	Yes	4	9	1
	5/81	Disposal of Tailings in the Rabbit Lake Open Pit	4* 5	Geocon (1975) Ltd.	V8488B	C	Yes	29	11	Yes	2	5	4
	5/81	Supplementary Report on the Disposal of Tailings in the Rabbit Lake Open Pit	4 5	Geocon (1975) Ltd.	V8488C	C	Yes	43	27	Yes	1	-	-
	1/82	Tailing Area Seepage Study, Rabbit Lake Uranium Mine, Wollaston Lake	1*	Geocon (1975) Ltd.	V8534	A	Yes	24	16	Yes	2	21	

* contains field data

TABLE 9
GEOTECHNICAL INFORMATION SOURCES
NUTP CANUT DATABASE

TAILINGS AREA	REPORT DATE (mo/yr)	TITLE	DATA CATEGORY	COMPANY/ AUTHOR	REPORT NO.	PRIORITY	PUBLIC INFO	DOCUMENT SIZE					
								PAGES	FIGURES	TABLES	APPND'S	BOREHOLES	TESTPITS
Beaverlodge, Saskatchewan	6/82	Decommissioning of the Beaverlodge Mine/Mill Operation and Reclamation of the Site		Eldorado Nuclear Limited	Report # 1		Yes						
	3/82	Decommission of the Beaverlodge Operation and Reclamation of the Site. An Engineering Feasibility Study of Potential Reclamation Concepts	1 3	Senes/ Golder	822-6006	A	Yes	81	17	Yes	5	-	-
	2/83	Decommissioning of the Beaverlodge Mine/Mill Operations and Reclamation of the Site	1* 2 3	MacLaren Plansearch Inc.	Report # 2	A	Yes	99	23	Yes	5	-	-
	2/83	Technical Report to Eldorado Nuclear Limited - Beaverlodge Tailings and Sludges Close-Out, Engineering Feasibility Studies	1* 2 3 4 5	Steffen, Robertson & Kirston (BC) Inc./ Clifton Assoc. Ltd.	Report # 3 53601/1	A	Yes	133	17	Yes	7	14d	-
	2/83	Hydrologic Investigations of the Tailings Management System		MacLaren Plansearch Inc.	Report # 2W 34470-0		Yes						
	4/83	Report to Eldorado Resources Ltd. Decommissioning of the Beaverlodge Mine/Mill Operations and the Reclamation of the Site. Environmental and Radiological Pathways Analysis	1 2 4	Senes	Report # 4	A	Yes	126	14	Yes	4	-	-
	8/83	Decommission of the Beaverlodge Mine/Mill Operations and Reclamation of the Site	4	Eldorado Resources Ltd.	Report # 5	C	Yes	36	6	Yes	1	-	-

* contains field data

TABLE 10
GEOTECHNICAL INFORMATION SOURCES
NUTP CANUT DATABASE

TAILINGS AREA	REPORT DATE (mo/yr)	TITLE	DATA CATEGORY	COMPANY/ AUTHOR	REPORT NO.	PRIORITY	PUBLIC INFO	DOCUMENT SIZE					
								PAGES	FIGURES	TABLES	APPND'S	BOREHOLES	TESTPITS
Eldorado, Meadow Lake & Ace Creek Saskatchewan	6/82	Report to Eldorado Resources Ltd. Subsurface Investigation Mine Water Lake, Meadow Lake and Ace Creek Discharge Area	5*	Golder	812-6040	C	Yes	12	23	-	-	109	-

* contains field data

ATTACHMENT D: List of Sources Collected by Senes Consultants Ltd., but not yet converted to machine readable media.

K-7	Environmental Year End Monitoring Report - 1982 P. Courtney and E. Krahn Key Lake Mining Corporation
R-16, R-17, R18	Annual Reports: 1972-1983, Air, Fish and Water Quality Data Gulf Minerals Canada Limited
R-19	Esquadat Records for Rabbit Lake, 1974-1983 Saskatchewan Environment
BV-02	Levels and Effects of Radionuclides in Aquatic Fauna of the Beaverlodge Area (Saskatchewan) December, 1982 Stella Swanson for Saskatchewan Research Council Environment Canada Atomic Energy Control Board Saskatchewan Environment
BV-04	Conceptual Reclamation Plan for Beaverlodge Fay/Verna Operations, June 1981 Eldorado Nuclear Limited
BV-45	An evaluation of Waste Discharges from the Beaverlodge Operations of Eldorado Nuclear Limited and Their Environmental Implications (Dec. 1980) For Eldorado Nuclear Ltd. By Saskmont Engineering Co. Ltd.

BV-71 The Problem of Abandoned Uranium Tailings in Northern Saskatchewan, An Overview
by S. Swanson, Z. Abouguendia
Saskatchewan Research Council, Nov. 1981

M2,M3,M4 Radiological Water Quality Monitoring Program in the Bancroft Area (1976-1983)
Ontario Ministry of the Environment

M9 Proposal for Decommissioning and Close Out of the Bancroft Property
F. Clyde Lendrum Consulting Company for
Madawaska Mined Ltd.

M1,E1 Water Pollution from the Uranium Mining Industry in the Elliot Lake and Bancroft Areas
Volume 2 - Detailed Findings. March 1972
Ontario Water Resources Commission

A-1 Agnew Lake HI-VOL Air Sampling Survey, May 10, 77 to June 29, 77
R. Potvin for
Ontario Ministry of the Environment

A-3 Agnew Lake HI-VOL Air Sampling Survey, June 78
R. Potvin
Ontario Ministry of the Environment

C-1 Environmental Baseline Survey of the Cluff and Caswell Lake Areas (Aug. 1975).
W.W. Sawchyn of Saskatchewan Research Council for
Stearn Rogers Inc. and Amok Ltd.

C-2 Annual Report, Meteorological and Air Quality Studies, Cluff Lake
Stearns-Roger Inc. for
Amok Limited.

C-10 Cluff Lake Development, Phase II, Environmental Impact Assessment Appendicies (Nov. 1982)

C-11 Annual Environmental Summary Report, Cluff lake Uranium Mine. (1982)
Amok Limited

C-12 Hydrogeologic Monitoring at Cluff Mining during 1982
W.A. Menely Consultants Ltd for
Cluff Mining

C-13 Esquadat Files Printout for Cluff Lake Stations (1983)
Saskatchewan Ministry of Environment

C-14 Phase I Extension Mining and Milling, Water Quality Monitoring Program, Monthly Report for August 1983.
Amok Limited

R-2 Environmental Survey of Wallaston Lake, Saskatchewan Sept. 73
W.W. Sawchyn, Saskatchewan Research Council for
Gulf Minerals Canada Ltd.

R-5 Corrective Action and Results in Minimizing RA-226 Concentration in Mine-Mill Effluents of the Rabbit Lake Uranium Operation 1977.
Gulf Minerals Canada Ltd.

R-6 Selected Members of the Uranium Series in the Ambient Suspended Particulates near Two Operating Uranium Mills in Northern Saskatchewan. (Dec 1980)
A. Zaidi
Environmental Protection Service

R-7 The Collins Bay B-Zone Development, Rabbit Lake Operation
September 1980 (original Report), March, June and November 1981 (addenda)

R-9 Report to Gulf Minerals Canada Limited on Tailings Area Seepage Study, Rabbit Lake Uranium Mine (Jan. 1982).
GEOCON Incorporated

E-4 Environmental Assessment of the Proposed Elliot Lake Uranium Mines Expansion, Volume 1, Background Information (March 77)
James F. MacLaren Ltd. for
Denison Mines/Rio Algom Ltd.

E-5 Environmental Assessment of the Proposed Elliott Lake Uranium Mines Expansion Volume 2,
Background Information Update (Feb 78)
James F. MacLaren Limited
Denison Mines Limited/Rio Algom Limited

E-6 Environmental Assessment of the Proposed Elliot Lake Uranium Mines Expansion, Volume 4, Environmental Assessment
James F. MacLaren Ltd. for
Denison Mines Ltd/Rio Algom Ltd.

E-9 PH-Radium Surveys of Quirke Lake (1979)
Denison Mines Ltd.

E-11 Ontario Ministry of Health Air Quality Monitoring
March 65-March 67
Ontario Ministry of Health

E-12 Characterization of Tailings (1977)
E. LaRoque and E. Pakkala
Denison Mines Limited
and
Characterization of Tailings (1977)
E. Barnes
Rio Algom Limited

O-1, P-1 Radiological Water Pollution in the Elliot Lake and Bancroft Areas. (1965)
Deputy Minister's Committee

ATTACHMENT E: List of Sources Collected By Golder Associates

TABLE OF CONTENTS

QUIRKE MINE

Golder Associates Report No. 801-1051-2 "Report to Rio Algom Limited, Borrow Materials Investigation, Quirke Mine Tailings Basin Expansion, Contract MP-0001, Project 262, Elliot Lake, Ontario", dated May, 1981.

Golder Associates Report No. 801-1089-9 "Final Report to Rio Algom Limited, Geotechnical Investigation and Design Recommendations, East Dyke Spillway and Culverts, Quirke Tailings Basin Expansion, Contract MP-100, Project 262, Elliot Lake, Ontario", dated May, 1981.

Golder Associates Report No. 801-1089-12 "Report to Rio Algom Limited, Stability of the East Dyke, Quirke Mine Tailings Management Area, Elliot Lake, Ontario", dated June, 1981.

Golder Associates Report No. 801-1089-6 "Report to Rio Algom Limited, Geotechnical Investigation and Design Recommendations, Dam G_2, Quirke Tailings Basin Expansion, Contract MP-0001, Project 262, Elliot Lake, Ontario", dated September, 1981.

Golder Associates Report No. 801-1089-7 "Report to Rio Algom Limited, Geotechnical Investigation and Design Recommendations, Dam K_1, Quirke Tailings Basin Expansion, Contract MP-0001, Project 262, Elliot Lake, Ontario" dated September, 1981.

Golder Associates Report No. 801-1089-8 "Report to Rio Algom Limited, Geotechnical Investigation and Design Recommendations, Dam K_2, Quirke Tailings Basin Expansion, Contract MP-0001, Project 262, Elliot Lake, Ontario" dated September, 1981.

Golder Associates Report No. 801-1089-10 "Report to Rio Algom Limited, Geotechnical Investigation and Design Recommendations, Dam L, Quirke Tailings Basin Expansion, Contract MP-0001, Project 262, Elliot Lake, Ontario", dated October, 1981.

Golder Associates Report No. 811-1090-1 "Report to Rio Algom Limited, Geotechnical Investigation and Design Recommendations, Berm M, Quirke Tailings Basin Expansion, Contract MP-0001, Project 262, Elliot Lake, Ontario", dated December, 1981.

Golder Associates Report No. 811-1325 "Report to Rio Algom Limited, As-Built Report 1981 Construction, Dams J (Stage I), I and G_1, Quirke Tailings Basin Expansion, Elliot Lake, Ontario", dated August, 1982.

Golder/SENES Report No. 821-1163 "Report to Rio Algom Limited, Quirke Mine Tailings Impoundment, Hydrogeological Re-assessment of West End of Tailings Basin", dated October, 1982.

Golder/SENES Report No. 821-1181 "Report to Rio Algom Limited, Quirke Mine Tailings Impoundment, Evaluation of Existing Effluent Treatment Ponds", dated December, 1982.

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PANEL MINE

Golder Associates Report No. 72159 "Rio Algom Mines Limited, Diversion Structure, Strike Lake Disposal Area, Preliminary Investigation, Elliot Lake, Ontario" dated January, 1973.

Golder Associates Report No. 771031 "Interim Report to Rio Algom Limited, Geotechnical Investigation, Strike Lake Tailings Impoundment, Panel Project, Contract 230 A 10, Elliot Lake, Ontario, Volume II", dated November, 1977.

James F. MacLaren "Report to Rio Algom Limited on Panel Mine Tailings Impoundment, Volume I - Site Selection and Recommended Deposition Scheme" dated November, 1977.

Golder/MacLaren "Report to Rio Algom Limited on Panel Mine Tailings Impoundment, Volume III - Design Brief, Construction of 1978 Facilities", dated February, 1978.

Golder Associates Report No. 771066Y "Report to Rio Algom Limited, Geotechnical Aspects, Proposed Drainage Diversion North of Strike Lake,Panel Mine Rehabilitation, Elliot Lake, Ontario", dated February, 1978.

Golder/MacLaren Report No. 781065 "Report to Rio Algom Limited on Panel Mine Tailings Impoundment, Volume IV - (1) Ground and Surface Water Quality Monitoring Program; (2) Estimated Release of Pollutants at Abandonment; (3) Basin Permeability Study", dated June, 1978.

James F. MacLaren Report No. 10957-5 "Report to Rio Algom Limited, Volume V - Preliminary Design Brief, Panel Mine Effluent Treatment Facilities", dated December, 1978.

Golder Associates Report No. 771031-1 "Report to Rio Algom Limited, Supplementary Data, Strike Lake Tailings Impoundment, Panel Project, Contract 231 A 10, Elliot Lake, Ontario", dated April, 1979.

Golder/MacLaren Report No. 771066-P "Report to Rio Algom Limited on Panel Mine Tailings Impoundment, Volume VI - (1) Tailings Deposition Scheme; (2) Details of Tailings Effluent Treatment System", dated May, 1979.

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STANLEIGH MINE

Golder Associates Report No. 791-1200 "Report to Rio Algom Limited, Stanleigh Mine Tailings Impoundment, Volume 3 - Hydrogeological Assessment of the Tailings Impoundment Basin; Part A - Factual Results of Geological and Hydrogeological Studies (Appendices)", dated June, 1980.

Golder Associates Report No. 791-1259 "Report to Rio Algom Limited, Stanleigh Mine Tailings Impoundment, Volume 3 - Hydrogeological Assessment of the Tailings Impoundment Basin; Part B - Assessment of Potential Flow Paths and Seepage Quantities from Tailings Impoundment Basin", dated October, 1980.

Golder/MacLaren Report No. 801-1215 "Report to Rio Algom Limited, Stanleigh Mine Tailings Impoundment, Volume 3 - Hydrogeological Assessment of the Tailings Impoundment Basin; Part C - Assessment of Impact of Potential Seepage on Surrounding Environment", dated December, 1980.

Golder/MacLaren "Report to Rio Algom Limited, Stanleigh Mine Tailings Impoundment, Volume 5 - Design Brief", dated February, 1981.

Golder Associates Report No. 791-1347-6 "Report to Rio Algom Limited, Geotechnical Investigation and Design, Dams 9 and 10, Tailings Management Area, Stanleigh Project, Elliot Lake, Ontario", dated February, 1981.

Golder Associates Report No. 791-1347-7 "Report to Rio Algom Limited, Geotechnical Investigation and Design, Dam A, Tailings Management Area, Stanleigh Project, Elliot Lake, Ontario", dated March, 1981.

Golder Associates Report No. 791-1347-8 "Report to Rio Algom Limited, Geotechnical Investigation and Design, Dam B, Tailings Management Area, Stanleigh Project, Elliot Lake, Ontario", dated March, 1981.

Golder Associates Report No. 791-1192 "Factual Report to Rio Algom Limited, Contract 231 A 15, Geotechnical Investigation, Stanleigh Mine Water Supply and Tailings Management Scheme, Elliot Lake, Ontario", dated May, 1981.

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QUIRKE MINE

Golder Associates Report No. 771139 "Report to Rio Algom Limited, Contract 223 A 61, Subsurface Investigation, Proposed Evans Lake Protection, Quirke Mine Tailings Disposal Area, Elliot Lake, Ontario", dated August, 1977.

Golder Associates Report No. 771051 "Report on Geotechnical Investigation, Existing Quirke Mine Tailings Management Area, Elliot Lake, Ontario, Volume I - Stability/Seepage Conditions; Perimeter Containment Dams and Treatment Facilities", dated March, 1978.

Weston Geophysical Research, Inc. "Seismic Risk at Elliot Lake".

Golder/MacLaren Report No. 781300 "Report to Rio Algom Limited on Quirke Mine Tailings Impoundment, Volume I - 1979-1982 Internal Development Program", dated July, 1979.

Marshall L. Silver "Cyclic Strength of Undisturbed Sand Tailings, Rio Algom Limited, Quirke Mine Tailings Management Area, Ontario, Canada", dated November, 1979.

Golder/MacLaren Report 801-1051 "Report to Rio Algom Limited on Quirke Mine Tailings Impoundment, Volume II - Site Selection Report", dated February, 1980.

Golder Associates Report No. 801-1089-1 "Report to Rio Algom Limited, Geotechnical Investigation and Design Recommendations, Lake C Diversion Scheme (Dam H and Diversion Channel), Quirke Tailings Basin Expansion, Contract MP-0001, Project 262 Elliot Lake, Ontario", dated August, 1980.

Golder/MacLaren "Report to Rio Algom Limited, Quirke Mine Tailings Impoundment, Volume III - Design Brief", dated December, 1980.

Golder Associates Report No. 801-1089-2 "Report to Rio Algom Limited, Geotechnical Investigation and Design Recommendations, Dam J, Quirke Tailings Basin Expansion, Contract MP-0001, Project 262, Elliot Lake, Ontario", dated January, 1981.

Golder Associates Report No. 801-1089-3 "Report to Rio Algom Limited, Geotechnical Investigation and Design Recommendations, Evans Lake Diversion Channel, Quirke Tailings Basin Expansion, Contract MP-0001, Project 262, Elliot Lake, Ontario" dated January, 1981.

Golder Associates Report No. 801-1089-4 "Report to Rio Algom Limited, Geotechnical Investigation and Design Recommendations, Dam I, Quirke Tailings Basin Expansion, Contract MP-0001, Project 262, Elliot Lake, Ontario", dated February, 1981.

TABLE OF CONTENTS (CONT.)

Golder Associates Report No. 801-1089-5 "Report to Rio Algom Limited, Geotechnical Investigation and Design Recommendations, Dam G_1, Quirke Tailings Basin Expansion, Contract MP-0001, Project 262, Elliot Lake, Ontario", dated February, 1981.

Golder/MacLaren Report No. 801-1087 "Report to Rio Algom Limited, Quirke Mine Tailings Impoundment, Volume IV - Hydrogeological Assessment of the Tailings Impoundment Basin", dated February, 1981.

ATTACHMENT F: List of Sources Converted to Machine Readable Media

Study #1

Environmental Assessment of the Proposed Elliot Lake Uranium Mines Expansion - Volume 2 Background Information Update - February 1978
James F. MacLaren Limited

201 Samples - Air Water: Fish Data
Tape# DEL071
Location: CSC

Study #2

Annual Environmental Report - 1982
Gulf Minerals

309 Air & Water Quality Samples
Tape# ADS116
Location: CSC

Study #3

Annual Environment Report - 1981
Gulf Minerals

90 Air, Water, Spil and Plant Samples
Tape# ADS116
Location: CSC

Study #4

Air Quality Assessment Studies carried out in the Elliot Lake Area 1976-1980
Ontario Ministry of the Environment

A compilation of Data Collected by:

- The Ontario Ministry of the Environment
- The Ontario Ministry of Labour
- Rio Algom Limited
- Denison Mines Limited
- James F. MacLaren Limited

1055 Air Quality Samples
Tape# DEL078
Location: CSC

Study #5

Cardiff Area - Radiological Program
Ontario Ministry of the Environment

21 Water Quality Samples
Tape# ADS043
Location: CSC

Study #6

Radiological Monitoring - Bancroft Area - Appendix B
Ontario Ministry of the Environment

22 Water Quality Samples
Tape# ADS043
Location: CSC

Study #7

Radiological Monitoring - Bancroft Area - Appendix A
Ontario Ministry of the Environment

59 Water Quality Samples
Tape# ADS043
Location: CSC

Study #8

Radiological Results - Cardiff Area
Ontario Ministry of the Environment

221 Water Quality Samples
Tape# ADS010
Location: CSC

Study #9

Radioactive Sampling - Cardiff Area
Ontario Ministry of the Environment
Ontario Ministry of Labour

83 Water Quality Samples
Tape# ADS010
Location: CSC

Study #10

Cardiff Radioactive Study
Ontario Ministry of the Environment

76 Water Quality Samples
Tape# DEL056
Location: CSC

Study #11

Radiological Survey - Bancroft Area
Ontario Ministry of the Environment
Ontario Ministry of Labour

7 Water Quality Samples
Tape# DEL056
Location: CSC

Study #12

Geotechnical Investigation
Strike Lake Tailings Impoundment
Panel Project Contract 230A10
Elliot Lake Ontario
Volume II
Golder Associates (771031)

22 Boreholes
Tape# DEL 228
Location: CSC

Study #13

Supplementary Data
Strike Lake Tailings Impoundment
Panel Project Contract 230A10
Elliot Lake Ontario
Golder Associates, April, 1979

13 Boreholes, 8 Test Pits, 10 Probes
Tape# DEL228
Location: CSC

Study #14

Subsurface Investigation
Proposed Evans Lake Portection
Quirke Mines Tailings Disposal Area
Elliot Lake Ontario
Golder Associates (771130), August, 1977

6 Boreholes
Tape# DEL228
Location: CSC

Study #15

Geotechnical Investigation
Existing Quirke Mine Tailings Management Area
Volume 1
Elliot Lake Ontario

Golder Associates (771051), March, 1978

37 Borehole,
Tape# Del228 Location: CSC

Study #16

Water Sampling for the Ministry of the Environment
Radiological Survey
Ontario Ministry of Health

21 Water Quality Samples
Tape# DEL056
Location: CSC

Study #17

1981 MOE Data for Cardiff Area
Ontario Ministry of the Environment

73 Samples - Water
Tape# DEL056
Location: CSC

Study #18

1982 MOE Data for Cardiff Area
Ontario Ministry of the Environment

44 Samples
Tape# DEL056
Location: CSC

Study #19

1983 MOE Data for Cardiff Area

Ontario Ministry of the Environment

46 Samples

Tape# DEL056

Location: CSC

ATTACHMENT G: Transcription Forms Designed by Systemhouse Ltd.

These forms are actually 11x17 inches and have been reduced to 81/2x11 inches so that they may be easily included in this report.

NATIONAL URANIUM TAILINGS PROGRAM

ENERGY MINES & RESOURCES

Systemhouse Ltd

STUDY DATA SHEET

RECORD TYPE 1 STUDY ID ☐☐☐☐

PUBLICATION YEAR ☐☐☐☐

MAIN SPONSOR

STUDY DESCRIPTION

STUDY TITLE

REMARKS

SDS no

FORM D84-078 SDS

NATIONAL URANIUM TAILINGS PROGRAM

ENERGY MINES & RESOURCES

Systemhouse Ltd

SAMPLE DATA

RECORD TYPE 2

TAILING SITE

STUDY ID

SAMPLE IDENTIFIER

REFERENCE IDENTIFIER

FROM: DATE, TIME

TO: DATE, TIME

DURATION

LOCATION: QUALIFIER, EASTING

LOCATION: NORTHING, ZONE, LATITUDE, LONGITUDE

POINT ELEVATION

SAMPLE DEPTH

UNITS

TREATMENT

REMARKS

SAMPLE DESCRIPTION

LOCATION DESCRIPTION

BOREHOLE SAMPLE DATA

RECORD TYPE 4

TAILING SITE

STUDY ID

SAMPLE IDENTIFIER

REFERENCE IDENTIFIER

SAMPLING DATE

SAMPLE DESCRIPTION

COLLAR ELEVATION

INCLINE

AZIMUTH

ALONG HOLE LENGTH

COLLAR/LENGTH UNITS

MINE GRID COORDINATES: N, E

LOCATION DESCRIPTION

FORM D84-079-SD

NATIONAL URANIUM TAILINGS PROGRAM

ENERGY MINES & RESOURCES

Systemhouse Ltd

MEASUREMENT & RESULT DATA

RECORD TYPE 3

STUDY ID ☐☐☐☐

SAMPLE IDENTIFIER ☐☐☐☐☐☐☐

	PARAMETER	MEASUREMENT TYPE	DETECT LIMIT	VALUE	CONFIDENCE INTERVAL	UNITS
1				10	10	
2				10	10	
3				10	10	
4				10	10	
5				10	10	
6				10	10	
7				10	10	
8				10	10	
9				10	10	
10				10	10	
11				10	10	
12				10	10	
13				10	10	
14				10	10	
15				10	10	
16				10	10	
17				10	10	
18				10	10	
19				10	10	
20				10	10	
21				10	10	
22				10	10	
23				10	10	
24				10	10	
25				10	10	

REMARKS:

MRD no:

FORM 084-077 MRD

NATIONAL URANIUM TAILINGS PROGRAM

ENERGY MINES & RESOURCES

Systemhouse Ltd.

BOREHOLE OBSERVATION DATA

RECORD TYPE 5 STUDY ID ☐☐☐☐ SAMPLE IDENTIFIER: ☐☐☐☐☐☐☐

	DEPTH INTERVAL			MEASUREMENT TYPE	OBSERVATION
	UNITS	FROM	TO		
1		.	.		
2		.	.		
3		.	.		
4		.	.		
5		.	.		
6		.	.		
7		.	.		
8		.	.		
9		.	.		
10		.	.		
11		.	.		
12		.	.		
13		.	.		
14		.	.		
15		.	.		
16		.	.		
17		.	.		
18		.	.		
19		.	.		
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21		.	.		
22		.	.		
23		.	.		
24		.	.		
25		.	.		

REMARKS:

BOC no.

FORM D84-076 BOD

NATIONAL URANIUM TAILINGS PROGRAM

ENERGY MINES & RESOURCES

Systemhouse Ltd

BOREHOLE MEASUREMENT DATA

RECORD TYPE: 6　STUDY ID: ☐☐☐☐　SAMPLE IDENTIFIER: ☐☐☐☐☐☐☐

	DEPTH INTERVAL			PARAMETER	MEASUREMENT TYPE	VALUE	UNITS
	UNITS	FROM	TO				
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
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22							
23							
24							
25							

REMARKS:

BMR no

FORM D 4-075 BMD

ATTACHMENT H: Data Encoding Instructions

ENERGY, MINES AND RESOURCES CANADA

CANMET, NATIONAL URANIUM TAILINGS PROGRAM
DATA COLLECTION ENCODING INSTRUCTIONS

MARY GEBERDT
SYSTEMHOUSE LTD.
MARCH, 1984

INTRODUCTION

This document was prepared as part of the collection of data relevant to uranium tailings. This guide is to be referenced when encoding the five data capture forms prepared by Systemhouse Ltd. in conjunction with the Uranium Tailings Program.

The guide is organized by record type. To use the guide, refer to the pre-printed record type on the form under consideration and refer to the corresponding section in the guide. The field names in the guide will match those on the form for easy cross-reference.

If the guide does not answer all your questions, contact the Systemhouse Data Collection Project Team or the CANUT Database Administrator at (613) 992-6381.

STUDY DATA

RECORD TYPE: This field is always "1" to identify the form as Study Data.

STUDY ID: A sequential number assigned by National Uranium Tailings Program (NUTP) personnel to uniquely identify each study received. Leave this field blank.

PUBLICATION YEAR: The year in which the study was published or released. In the case where data is collected on a continuous basis, enter the year in which the samples were taken.

MAIN SPONSOR: The name or other identification of the main sponsor of the study or report.

STUDY DESCRIPTION: A short terse description of the study contents, i.e.) 35 Samples, 100 Results.

STUDY TITLE: The title given to the study or report from which the data originated.

SAMPLE DATA

RECORD TYPE: This field is always "2" to identify the form as Sample Data.

TAILINGS SITE ID: The name of the closest tailings containment facility to where the samples were collected. Enter one of the names on the Tailings Site master list supplied, exactly as shown. If none of the names apply, contact Mina Pun (the NUTP Database Administrator) with the proper Tailings Site name in order to keep the master list up to date.

STUDY ID: The sequential number assigned by the NUTP personnel on the Study Data form. Leave this field blank.

SAMPLE IDENTIFIER: The identifier for the sample which distinguishes it from other samples taken for this study. Use the same identifier as was used in the report. In absence of any such identifier, assign a value yourself but use a unique identifier for each sample.

REFERENCE IDENTIFIER: An identifier for the particular sampling station which distinguishes it from all others. Leave this field blank, as the NUTP personnel will be assigning the identifier.

DATE/TIME FROM (YYMMDDHHMMSS): The date and time on which the sample was taken, or in some cases, when the sample period was started. Note the format of the year, month, day, hour, minutes and seconds is positional. For example, if only the year and the month are known, enter the year and the month in the first four positions. For any information that is missing, leave the corresponding positions blank.

DATE/TIME TO (YYMMDDHHMMSS): The date and time on which the sample period was ended. If the sampling was not over a period of time, leave this field blank. Otherwise, enter the information in the same manner as Date/Time From.

DURATION (YYMMDDHHMMSS): The duration of the sample period in years, months, days, hours, minutes and/or seconds. This information is not required unless the sampling was over a time interval, rather than at a particular point in time. In this case, the duration is entered in the same format as the Date/Time From field. Otherwise, leave this field blank.

LOCATION QUALIFIER: The accuracy to which the sample location is known. In UTM measurements, the qualifier would be plus or minus so many metres. In Longitude and Latitude, the qualifier would be in decimal degrees. Code DEFAUL if the default coordinates for the tailings site are used. Default coordinates should only be used when the general area of the

LOCATION QUALIFIER: (cont'd)	tailings site is given and the actual UTM or LAT/LONG coordinates are not given. Otherwise, Location coordinates are left blank if unknown.
EASTING:	The UTM easting coordinate of the sample location. Note that there is one decimal place which should be zero if the measurement is not that precise. If UTM coordinates are not available and default values not used, leave the field blank.
NORTHING:	The UTM northing coordinate of the sample location. Note that the field allows for one decimal place. If the measurement is not that precise, enter a zero for the decimal. If UTM coordinates are not available and default values not used, leave the field blank.
ZONE:	The UTM zone coordinate of the sample location for the easting and northing. If UTM coordinates are not available, leave the field blank.
LATITUDE:	The latitude coordinate of the sample location in decimal degrees. Note that five decimal places have been allocated. If UTM coordinates are available, then they should be used and this field left blank.
LONGITUDE:	The longitude coordinate of the sample location in decimal degrees. Note that the field allows for five decimal places after the degrees. If UTM coordinates are available, they should be used instead of latitude and longitude. In which case, this field would be left blank.

STATION/SAMPLING POINT ELEVATION: The height above mean sea level in metres of the station at which the sample was taken. The range of values is from 0.00 to 5000.00 metres.

SAMPLE DEPTH: The depth of the sample from the surface. The range of values is from 0.00 to 9999.99 metres. By convention, negative values are above the surface.

UNITS: The abbreviation for the units used for both Point Elevation and Sample Depth, taken from the attached master list.

SAMPLE TREATMENT: A combination of up to three codes identifying how the sample was prepared and handled. The acceptable codes are as follows:

A - ashed
B - ash-free
C - frozen
D - dried
E - filtered
F - acidified
G - extracted
H - preserved (other)
I - not treated

SAMPLE DESCRIPTION: A brief description of the sample material.

LOCATION DESCRIPTION: A narrative description of the location of the sampling station.

MEASUREMENT AND RESULTS DATA

RECORD TYPE:	This field is always "3" to identify the form as Sample Data - Measurements.
STUDY ID:	The sequential number assigned by NUTP personnel on the Study Data form. Leave this field blank.
SAMPLE IDENTIFIER:	The identifier for the sample that had been entered on the Sample Data form. This information is required in order to link the measurements to the appropriate sample.
PARAMETER:	A description of the material or condition being tested for, and the analytical method. Use the appropriate symbol(s) from the Periodic Table if possible.
MEASUREMENT TYPE:	A code indicating the type of measurement based on the Parameter description. Leave this field blank, as the code will be assigned by NUTP personnel.
DETECT. LIMIT:	An indicator used to show that the value is a detectable limit. Enter "<" if the limit is less than and ">" if it is greater than. If the value is not a detectable limit, the field is left blank.
VALUE:	The value of the measurement in the units specified on this form. Note that the value is entered with six integers and five decimal places. If the value is an exponential number, enter a "+" or "-" with the exponent after the "X 10". If there is no exponent, leave that area blank.

CONFIDENCE INTERVAL: A value indicating the quality of the reported value. This value will vary with laboratory, analytical method and sample type. Enter this value in the same format as the measurement value. Leave the field blank if there is no confidence interval reported.

UNITS: The abbreviation for the unit of the sample measurement, taken from the attached master list. If the required unit is not on the list, contact Mina Pun at the NUTP Office for the appropriate abbreviation, and the master list will be updated accordingly.

BOREHOLE SAMPLE DATA

RECORD TYPE: This field is always "4" to identify the form as Borehole Sample Data.

TAILINGS SITE ID: The name of the closest tailings containment facility to where the samples were collected. Enter one of the names on the Tailings Site master list supplied, exactly as shown. If none of the names apply, contact Mina Pun (the NUTP Database Administrator) with the proper Tailings Site name in order to keep the master list up to date.

STUDY ID: The sequential number assigned by NUTP personnel on the Study Data form. Leave this field blank.

SAMPLE IDENTIFIER: An identifier for the borehole sample which distinguishes it from other samples taken for this study.

REFERENCE IDENTIFIER: An identifier for the particular borehole sample site which distinguishes it from others. Leave this field blank since NUTP personnel will be assigning the identifier.

SAMPLING DATE (YY/MM/DD): The date on which the sample was taken. Enter the date as year, month and day.

SAMPLE DESCRIPTION: A brief description of the sample material or composition.

COLLAR ELEVATION:	The height above surface level of the borehole collar. The range in value is from 0.00 to 9999.99 in the units specified.
INCLINATION:	The amount of slope or deviation from the horizontal of the borehole in degrees.
AZIMUTH:	The azimuth of the borehole is the deviation of the direction of the hole from the North Pole in degrees.
ALONG HOLE LENGTH:	The total length of the borehole. The value range is from 0.00 to 99999.99 in the units specified.
COLLAR/LENGTH UNITS:	An abbreviation of the units used to measure the Collar Elevation and the Along Hole Length. Use the units master list for the correct abbreviation.
MINE GRID COORDINATES - N:	The north mine grid coordinate of the borehole location. The capacity of this field is from 0.00 to 999999.99.
MINE GRID COORDINATES - E:	The east mine grid coordinate of the borehole location. The field capacity is from 0.00 to 99999.99.
LOCATION DESCRIPTION:	A narrative description of the location of the borehole.

BOREHOLE OBSERVATION DATA

RECORD TYPE: This field is always "5" to identify the form as Sample Data - Borehole Observation.

STUDY ID: The sequential number assigned by NUTP personnel on the Study Data form. Leave this field blank.

SAMPLE IDENTIFIER: The identifier given to the borehole sample for which the observations were made, as entered on the Borehole Sample Data form.

DEPTH INTERVAL UNITS: An abbreviation of the units used for the depth interval measurements. Use the Units master list for the correct abbreviation.

DEPTH INTERVAL FROM: The depth at which the observation of the borehole sample started from. The range in value is from 0.00 to 99999.98 in the units specified.

DEPTH INTERVAL TO: The depth at which the observation of the borehole sample ended. The range in value is from 0.01 to 99999.99 in the units specified.

MEASUREMENT TYPE: A code indicating the type of measurement based on the Parameter description. This code will be assigned by NUTP personnel, so leave the field blank.

OBSERVATION: A brief description of the condition of the borehole sample or its composition of materials within the depth interval specified, i.e.) Quartzite.

BOREHOLE MEASUREMENT DATA

RECORD TYPE: This field is always "6" to identify this form as Sample Data - Borehole Measurements.

STUDY ID: The sequential number assigned by NUTP personnel on the Study Data form. Leave this field blank.

SAMPLE IDENTIFIER: The identifier given to the borehole sample for which the measurements were taken, as entered on the Borehole Sample Data form.

DEPTH INTERVAL FROM: The starting depth at which the measurements were taken from the borehole sample. The range in value is from 0.00 to 99999.98 in the units specified.

DEPTH INTERVAL TO: The end depth at which the measurements were taken from the borehole sample. The value ranges from 0.01 to 99999.99 in the units specified.

DEPTH INTERVAL UNITS: An abbreviation of the units used for the depth interval measurements. Use the Units master list for the correct abbreviation.

PARAMETER: A description of the material or condition being tested for, and the analytical method used. If possible, use the appropriate symbol(s) from the Periodic Table. An example of a parameter description would be: Pb total dissolved.

MEASUREMENT TYPE: A code indicating the type of measurement based on the Parameter description. This code will be assigned by NUTP personnel, so leave the field blank.

VALUE: The value of the measurement in the units specified. The value can range from -999999.99999 to +999999.99999.

UNITS: The abbreviation for the units of the borehole sample measurement, taken from the attached Units master list.

TAILINGS SITE IDENTIFIERS

AREA	TAILINGS SITE ID	ASSOCIATED NAMES AND LOCATIONS
Elliot Lake	Nordic	Nordic West Arm, Westner Lake, Buckles Creek, Town of Elliot Lake, North Nordic Lake, Nordic Lake, McCarthy Lake, Porridge Lake, Esten Lake, Elliot Lake
	Lacnor	Emma Creek, Nordic Tailings, Dumbell Lake
	Milliken	Sheriff Lake, Sheriff Creek, Crotch Lake, Elliot Lake, Town of Elliot Lake, Horne Lake
	Stanleigh	Crotch Lake, McCabe Lake, Strouth Lake, Penelope Lake, Hough Lake, Pecors Lake
	Pronto	North Channel, Serpent Harbour
	Quirke	Dunlop Lake, Camp Lake, Link Lake, Manfred Lake, Serpent River
	Panel	Strike (Frayn) Lake, Rochester Creek, Quirke Lake
	Stanrock	Can-met, Moose Lake, Pink Dragon (Orient) Lake, Quirke Lake
	Spanish Amer	Olive (North Span) Lake
	Denison	Stollery Lake, Upper Williams Lake, Lower Williams Lake, Long Lake, Serpent River
Agnew Lake	Agnew Lake	Agnew Lake
Bancroft	Bicroft	Auger Lake, Bicroft Swamp, Bicroft Proper, Paudash Lake, Deer Creek, Lower Paudash Lake, Beaver Lake, Mink Creek, Centre Lake
	Dyno	Farrel Lake, Farrel Creek
	Faraday	Bow Lake, Bentley Lake, Bentley Creek
	Madawaska	Bow Lake, Bentley Lake, Bentley Creek
Lorado	Lorado	Nero Lake, Crackingstone River, Beaver Lodge Lake, Uranium City

TAILINGS SITE IDENTIFIERS

AREA	TAILINGS SITE ID	ASSOCIATED NAMES AND LOCATIONS
Gunnar	Gunnar	Langley Bay, Gunnar Central "A", Gunnar Central "B", Mudford Lake (Gunnar Main)
Beaverlodge	Fay	Ace Creek, Minewater Lake, Ace Lake, Meadows Lake, Marie Lake, Fookes Lake, Greer Lake, Beaverlodge Lake, Eldorado Townsite
	Verna	Verna Lake, Ace Creek, Ace Lake, Strike Lake
	Dubyna	Ace Creek, Collier Lake, Foot Bay, Dubyna Lake, Shmoo Lake, Donaldson Lake
	Hab	Hab Lake, Virgin Lake, Minewater Lake, Milmine Lake, Pistol Lake, Mickey Lake
Cluff Lake	Cluff Lake	Snake Lake, Island Lake, Cluff Creek, Beaver Creek, Boulder Creek, Lac Claude, Claude Creek, Earl Creek, Peter River
Key Lake	Key Lake	Key Lake, David Creek, McDonald Creek, Douglas Creek, Yak Creek, Wheeler River, Russell Lake, McDonald Lake, Zimmer Lake, David Lake, Kirchner Lake, Raven Lake, Delta Lake, Northeast Lake, Northwest Lake, Black Forest Lake
Rabbit Lake	Rabbit Lake	Umperville River, Pow Bay, Horseshoe Lake, Hidden Bay, S02 Lake #100, S02 Lake #200, S02 Lake #300, S02 Lake #400, S02 Lake #500, S02 Lake #600, S02 Lake #700, Parks Lake, Tailings Pond, Precipitation Pond
	Collins Bay	Collins "A" zone, Colline "B" zone
Port Radium	Port Radium	Great Bear Lake, Echo Bay
Rayrock	Rayrock	Marian River

DEFAULT COORDINATES

	Tailings	Easting	Northing	Zone
1	Nordic	378000.0	5138000.0	17
2	Lacnor	378000.0	5139000.0	17
3	Milliken	375000.0	5140000.0	17
4	Stanleigh	376000.0	5141500.0	17
5	Pronto	369500.0	5118500.0	17
6	Quirke	372500.0	5151500.0	17
7	Panel	381500.0	5152000.0	17
8	Stanrock	381500.0	5147000.0	17
9	Spanish Amer	377000.0	5148000.0	17
10	Denison	376500.0	5149000.0	17
11	Agnew Lake	451800.0	5141500.0	17
12	Bicroft	733500.0	4985500.0	17
13	Dyno	729000.0	4981500.0	17
14	Faraday	743000.0	4989000.0	17
15	Madawaska	742500.0	4989500.0	17
16	Lorado	630500.0	6600000.0	12
17	Gunnar	620000.0	6585500.0	12
18	Fay	645500.0	6605000.0	12
19	Verna	645500.0	6606000.0	12
20	Dubyna	648000.0	6608500.0	12
21	Hab	645500.0	6612000.0	12
22	Cluff Lake	581000.0	6469000.0	12
23	Key Lake	457500.0	6340500.0	13
24	Rabbit Lake	577000.0	6447500.0	13
25	Collins Bay	579500.0	6458500.0	13
26	Port Radium	455000.0	7330800.0	11
27	Rayrock	522300.0	7357000.0	11

SAMPLE TYPE CODES

1000	Water	
	1100	surface water
	1200	ground water
	1300	experimental water
	1400	tailings water
	1500	extracted water
2000	air	
	2100	gas
	2200	particulate
	2300	precipitation
3000	soil	
	3100	bare soil
	3200	vegetation associated/covered
	3300	water covered
	3400	tailings covered
	3500	sediment
4000	rock	
	4100	grab sample
	4200	mill feed/ore
	4300	dam fill
	4400	drill core
	4500	waste rock
5000	tailings	
	5100	bare tailings
	5200	vegetation associated/covered
	5300	water covered
	5400	soil covered

SAMPLE TYPE CODES

6000	vegetation	
	6100	monocots
	6200	dicots
	6300	ferns
	6400	fungi
	6500	bacteria
	6600	algae
	6700	bryophytes
7000	animals	
	7100	fish
	7200	other aquatic animals
	7300	rodents
	7400	unqulates
	7500	predators
	7600	water birds
	7700	predatory birds
	7800	other birds
8000	phytotoxicology (misc.)	
	8020	not applicable

SAMPLE TYPE CODES

1100			surface water
	1110		lake
		1111	treated municipal water supply
	1120		pond
	1130		river
		1131	treated municipal water supply
	1140		stream
	1150		swamp/bog/marsh
	1160		plant waste water
		1161	mine waste water
		1162	mill waste water
	1170		tailings effluent
		1171	untreated tailings effluent
		1172	tailings effluent-treated
		1173	tailings effluent - 2nd treatment
	1180		domestic/industrial waste water
	1190		snow/ice
1200			ground water
	1210		mine seepage
	1220		piezometer well
	1240		well
	1250		spring
1400			tailings water
	1410		tailings pond water
	1420		tailings pond seepage
3200			vegetation associated/covered
	3210		with cattails
	3220		with trembling aspen
	3230		with sedges
	3240		with white birch
	3250		with moss
	3260		with algae
	3270		with grasses

SAMPLE TYPE CODES

- 5200 vegetation associated/covered
  - 5210 with cattails
  - 5220 with trembling aspen
  - 5230 with sedges
  - 5240 with white birch
  - 5250 with moss
  - 5260 with algae
  - 5270 with grasses

- 6100 monocots
  - 6110 cattails
    - 6111 stem/branch
    - 6112 seed/fruit
    - 6113 leaf
    - 6114 root
    - 6115 rhizome
  - 6120 sedges*

- 6200 dicots
  - 6210 white birch*
  - 6220 trembling aspen*

- 6700 bryophytes
  - 6710 mosses*

- 7100 fish
  - 7110 pickerel
    - 7111 whole
    - 7112 skin
    - 7113 flesh
    - 7114 liver
    - 7115 gonads
    - 7116 stomach
    - 7117 brain
    - 7118 heart
    - 7119 bone

SAMPLE TYPE CODES

	7120	perch*
	7130	trout*
	7140	sunfish*
	7150	bass*
	7160	pike*
	7170	muskelunge*
7200	other aquatic animals	
	7210	snails*
	7220	leeches*
	7230	clams*
	7240	crustaceans*
	7250	frogs*
7300	rodents	
	7310	beaver
	7320	muskrat
	7330	mice
7400	ungulates	
	7410	deer
	7420	moose
	7430	caribou
7500	predators	
	7510	bear
	7520	lynx
	7530	wolf
	7540	fox
	7550	wolverine
	7560	weasel
	7570	marten
	7580	skunk

* subcategories for other species in this group are not included for reasons of space. Contact the NUTP CANUT Database Administrator.

UNIT ABBREVIATIONS

TYPE OF PARAMETER	UNIT	ABBREVIATION
Analytical results	grams/litre	G/L
	milligrams/litre	MG/L
	micrograms/litre	UG/L
	nanograms/litre	NG/L
	picograms/litre	PG/L
	parts per million	PPM*
	parts per billion	PPB*
	milliequivalents/litre	MEQ/L
	moles/litre	MOL/L
	millimoles/litre	MMOL/L
	relative units	REL. UNITS
	weight percent	WT. PC
Specific conductance	siemens/cm	SIE/CM
	microsiemens/cm	USIE/CM
Altitude, depth, location	miles	MI*
	yards	YD*
	feet	FT*
	inches	IN*
	kilometres	KM
	metres	M
	centimetres	CM
	millimetres	MM
Area	square kilometres	KM2
	square centimetres	CM2
	hectares	HA
	acres	ACRES
Flow	cubic feet/second	CFS*
	cubic feet/minute	CFM*
	cubic feet/hour	CFH*
	imperial gallons/second	IGPS*
	imperial gallons/minute	IGPM*
	imperial gallons/day	IGPD*
	gallons (US)/second	GPS*
	gallons (US)/minute	GPM*
	gallons (US)/day	GPD*
	cubic metres/second	M3/S
	litres/second	L/S
	cubic decimetres/second	DM3/S
Redox potential	millivolts	MV

UNIT ABBREVIATIONS

TYPE OF PARAMETER	UNIT	ABBREVIATION
Density	grams/cubic cm	G/CM3
Surface tension	dynes/cm	DYN/CM
Threshold odour number	threshold odour number	TON
Turbidity	Jackson turbidity unit	JTU
	Formazin units	FZN UNITS
	foot candles	FT CANDLES
pH, saturation and stability indices	pH unit	PH UNITS
Chlorophyll	milligrams/cubic metre	MG/M3
Water consumption	1000 gallons/day	1000 GAL/DAY*
Bacteria and biology	number/decilitre	NO/DL
	number/millilitre	NO/ML
	thousand/millilitre	1000/ML
	number/litre	NO/L
	cells/millilitre	CELL/ML
	milligrams/litre dry wt	MG/L DRY
	milligrams of Carbon per Cubic metre per hour	MGC/M3/HR
Sediment analysis	micrograms/gram	UG/G
	milligrams/kilogram	MG/KG
	number/cubic metre	NO/M3
Time	minutes	MIN
	days	DAY
	hours	HR
	seconds	SEC
Temperature	degrees Celsius	DEG. C
	degrees Fahrenheit	DEG. F*
Atmospheric pressure	inches of mercury (at $0^{o}C$)	IN HG*
	millimetres of mercury (at $0^{o}C$)	MM HG*
	kilopascals	KPA
Velocity	kilometre/hour	KM/HR

UNIT ABBREVIATIONS

TYPE OF PARAMETER	UNIT	ABBREVIATION
Loadings	kilograms/day	KG/DAY
	grams/day	G/DAY
	tonnes/day	T/DAY
	litre/hectare/day	L/HA/DAY*
	gram/hectare/day	G/HA/DAY*
Radioactivity	picocurie/litre	PCI/L*
	becquerel/litre	BQ/L
	millibecquerel/litre	MBQ/L
	becquerel/gram	BQ/G
	millibecquerel/gram	MBQ/G
	becquerel/cubic metre	BQ/M3
	picocurie/gram	PCI/G
Miscellaneous	percent	%
	count (number)	NO
	alphabetic code	DESCRIPTIVE CODE

* use of these units is discouraged.

ATTACHMENT I: Keypunch Instructions

ENERGY, MINES AND RESOURCES CANADA

CANMET, NATIONAL URANIUM TAILINGS PROGRAM
DATA COLLECTION KEYPUNCH INSTRUCTIONS

MARY GEBERDT
SYSTEMHOUSE LTD.
MARCH, 1984

KEYPUNCH INSTRUCTION

System CANMET NATIONAL URANIUM TAILINGS PROGRAM (CANUT)	Page 1 Date 22/3/84
Instruction STUDY DATA SHEET	Instruction Number 1

Remarks

This is the first form of 5 different forms used in the data collection. Each record is a fixed length of 364 characters. The STUDY DATA SHEET should be followed by several forms for SAMPLE DATA and/or BOREHOLE SAMPLE DATA with their related forms.

Item	Data Element	Size	Position		Source	A/N	Punch Code	Special Instructions
			From	To				
1	RECORD TYPE	1	1	1		N		Value is 1.
2	STUDY ID	4	2	5		N		Right justify; zero fill, Blank if missing.
3	PUBLICATION YEAR	4	6	9		A		Year, format YYYY.
4	MAIN SPONSOR	25	10	34		A		Left justify.
5	STUDY DESCRIPTION	35	35	69		A		Left justify.
6	STUDY TITLE	240	70	309		A		Left justify
7	FILLER	55	310	364		A		Skip

KEYPUNCH INSTRUCTION

System CANMET NATIONAL URANIUM TAILINGS PROGRAM (CANUT)	Page 2 Date 22/3/84
Instruction SAMPLE DATA	Instruction Number 2

Remarks This is the second form of 5. These instructions pertain only to the first half of the sheet. Each record is a fixed length of 364 characters. The SAMPLE DATA form should be followed by 1 or more forms for MEASUREMENT & RESULT DATA.

Item	Data Element	Size	Position From	Position To	Source	A/N	Punch Code	Special Instructions
1	RECORD TYPE	1	1	1		N		Value is 2.
2	TAILING SITE	12	2	13		A		Left justify.
3	STUDY ID	4	14	17		N		Right justify; zero fill; Blank if missing.
4	SAMPLE IDENTIFIER	7	18	24		A		Left justify.
5	REFERENCE IDENTIFIER	12	25	36		A		Left justify.
6	DATE/TIME FROM (YYMMDDHHMMSS)	12	37	48		A		key as is; Imbedded blanks are possible.
7	DATE/TIME TO (YYMMDDHHMMSS)	12	49	60		A		key as is; Imbedded blanks are possible.
8	DURATION (YYMMDDHHMMSS)	12	61	72		A		key as is; Imbedded blanks are possible.
9	QUALIFIER	6	73	78		A		Left justify.

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KEYPUNCH INSTRUCTION

System CANMET NATIONAL URANIUM TAILINGS PROGRAM (CANUT)	Page 3
	Date 22/3/84
Instruction SAMPLE DATA	Instruction Number 2

Remarks This is the second form of 5. These instructions pertain only to the first half of the sheet. Each record is a fixed length of 364 characters. The SAMPLE DATA should be followed by 1 or more forms for MEASUREMENT & RESULT DATA.

Item	Data Element	Size	Position From	Position To	Source	A/N	Punch Code	Special Instructions
10	EASTING	7	79	85		N		Right justify; zero
								fill; Do not key decimal points.
11	NORTHING	8	86	93		N		Right justify; zero
								fill; Do not key decimal point.
12	ZONE	2	94	95		N		Right justify; zero
								fill; Blank if missing.
13	LATITUDE	7	96	102		N		Right justify; zero
								fill; Do not key decimal points;
								Blank if missing.
14	LONGITUDE	8	103	110		N		Right justify; zero
								fill; Do not key decimal point;
								Blank if missing.

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KEYPUNCH INSTRUCTION

System CANMET NATIONAL URANIUM TAILINGS PROGRAM	Page 4 Date 22/3/84
Instruction SAMPLE DATA	Instruction Number 2

Remarks This is the second form of 5. These instructions pertain only to the first half of the sheet. Each record is a fixed length of 364 characters. The SAMPLE DATA should be followed by 1 or more forms for MEASUREMENT & RESULT DATA.

Item	Data Element	Size	Position		Source	A/N	Punch Code	Special Instructions
			From	To				
15	POINT ELEVATION	6	111	116		N		Right justify; zero fill; Do not key decimal point; If data is too long, drop first character; Blank if missing.
16	SAMPLE DEPTH	6	117	122		N		Right justify; zero fill; Do not key decimal point; Blank if missing.
17	UNITS	4	123	126		A		Left justify.
18	TREATMENT	3	127	129		A		Left justify.
19	SAMPLE DESCRIPTION	35	130	164		A		Left justify.
20	LOCATION DESCRIPTION	200	165	364		A		Left justify.

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0009 (9/74)

KEYPUNCH INSTRUCTION

System
CANMET NATIONAL URANIUM TAILINGS PROGRAM (CANUT)

Page 5

Date 22/3/84

Instruction
BOREHOLE SAMPLE DATA

Instruction Number
3

Remarks
This is the second form of 5. These instructions pertain only to the second (lower) half of the sheet. Each record is a fixed length of 364 characters. The BOREHOLE SAMPLE DATA should be followed by 1 or more forms for BOREHOLE OBSERVATION and/or BOREHOLE MEASUREMENT DATA.

Item	Data Element	Size	Position		Source	A/N	Punch Code	Special Instructions
			From	To				
1	RECORD TYPE	1	1	1		N		Value is 4.
2	TAILING SITE	12	2	13		A		Left justify.
3	STUDY ID	4	14	17		N		Right justify; zero fill; Blank if missing.
4	SAMPLE IDENTIFIER	7	18	24		A		Left justify.
5	REFERENCE IDENTIFIER	12	25	36		A		Left justify.
6	SAMPLING DATE	6	37	42		A		Date, format YYMMDD; Day blank if missing.
7	SAMPLE DESCRIPTION	35	43	77		A		Left justify.
8	COLLAR ELEVATION	6	78	83		N		Right justify; zero fill; Do not key decimal point; Blank if missing.
9	INCLINE	3	84	86		N		Right justify; zero fill; Blank if missing.

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KEYPUNCH INSTRUCTION

System
CANMET NATIONAL URANIUM TAILINGS PROGRAM (CANUT)

Page 6

Date 22/3/84

Instruction
BOREHOLE SAMPLE DATA

Instruction Number
3

Remarks This is the second form of 5. These instructions pertain only to the lower half of the sheet. Each record is a fixed lenght of 364 characters. The BOREHOLE SAMPLE DATA should be followed by one or more forms for BOREHOLE OBSERVATION DATA and/or BOREHOLE MEASUREMENT DATA.

Item	Data Element	Size	Position		Source	A/N	Punch Code	Special Instructions
			From	To				
10	AZIMUTH	3	87	89		N		Right justify;zero fill blank if missing
11	ALONG HOLE LENGTH	7	90	96		N		Right justify; zero fill; Do not key decimal point; Blank if missing.
12	COLLAR/LENGTH UNITS	10	97	106		A		Left justify.
13	MINE GRID COORD. - N	8	107	114		N		Right justify; zero fill; Do not key decimal point; Blank if missing; Field is one character smaller than actual size.
14	MINE GRID COORD. - E	7	115	121		N		Right justify; zero fill; Do not key decimal point; Blank if missing.
15	LOCATION DESCRIPTION	200	122	321		A		Left justify.
16	FILLER	43	322	364		A		Skip.

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KEYPUNCH INSTRUCTION

System CANMET NATIONAL URANIUM TAILINGS PROGRAM (CANUT)	Page 7 Date 22/3/84
Instruction MEASUREMENT & RESULT DATA	Instruction Number 4

Remarks

This is the third form of 5. Each record is a fixed length of 364 characters. This form follows SAMPLE DATA.

Item	Data Element	Size	Position		Source	A/N	Punch Code	Special Instructions
			From	To				
1	RECORD TYPE	1	1	1		N		Value is 3.
2	STUDY ID	4	2	5		N		Right justify; zero fill; blank if missing.
3	SAMPLE IDENTIFIER	7	6	12		A		Left Justify.
4	PARAMETER	20	13	32		A		Left justify.
5	MEASUREMENT TYPE	7	33	39		A		Left justify.
6	DETECT LIMIT	1	40	40		A		Values are <,>or blank.
7	SIGN	1	41	41		A		Values are - or blank.
8	VALUE	11	42	52		N		Right justify; zero fill; do not key decimal point; blank if missing.
9	VALUE X10	3	53	55		A		Format ANN where A is +, - or blank and NN is numeric, right justify, zero or blank if missing.

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KEYPUNCH INSTRUCTION

System CANMET NATIONAL URANIUM TAILINGS PROGRAM (CANUT)	Page 8 Date 22/3/84
Instruction MEASUREMENT & RESULT DATA	Instruction Number 4

Remarks
This is the third form of 5. Each record is a fixed length of 364 characters. This form follows the SAMPLE DATA.

Item	Data Element	Size	Position From	Position To	Source	A/N	Punch Code	Special Instructions
9	CONFIDENCE INTERVAL	11	56	66		N		Right justify; zero fill; Do not key decimal point; Blank if missing.
10	CONFIDENCE INTERVAL X10	3	67	69		A		Format ANN where A is +, - or blank and NN is numeric, right justify, zero fill or blank if missing.
11	UNITS	10	70	79		A		Left justify.
12	FILLER	285	80	364		A		Skip.

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KEYPUNCH INSTRUCTION

System	
CANMET NATIONAL URANIUM TAILINGS PROGRAM (CANUT)	Page 9 Date 22/3/84
Instruction BOREHOLE OBSERVATION DATA	Instruction Number 5

Remarks This is the fourth form of 5. Each record is a fixed length of 364 characters. This form follows the BOREHOLE SAMPLE DATA.

Item	Data Element	Size	Position		Source	A/N	Punch Code	Special Instructions
			From	To				
1	RECORD TYPE	1	1	1		N		Value is 5.
2	STUDY ID	4	2	5		N		Right justify; zero fill; Blank if missing.
3	SAMPLE IDENTIFIER	7	6	12		A		Left justify.
4	DEPTH INTERVAL UNITS	2	13	14		A		Left justify.
5	DEPTH INTERVAL FROM	7	15	21		N		Right justify; zero fill; Do not key decimal point; Blank if missing.
6	DEPTH INTERVAL TO	7	22	28		N		Right justify; zero fill; Do not key decimal point; Blank if missing.
7	MEASUREMENT TYPE	7	29	35		A		Left justify.
8	OBSERVATION	20	36	55		A		Left justify.
9	FILLER	309	56	364		A		Skip.

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0009 (9/74)

KEYPUNCH INSTRUCTION

System

CANMET NATIONAL URANIUM TAILINGS PROGRAM (CANUT)

Page 10

Date 22/3/84

Instruction

BOREHOLE MEASUREMENT DATA

Instruction Number

6

Remarks This is the fifth form of 5. Each record is a fixed length of 364 characters. This form follows either the BOREHOLE SAMPLE DATA or BOREHOLE OBSERVATION DATA.

Item	Data Element	Size	Position		Source	A/N	Punch Code	Special Instructions
			From	To				
1	RECORD TYPE	1	1	1		N		Value is 6.
2	STUDY ID	4	2	5		N		Right justify; zero fill; Blank if missing.
3	SAMPLE IDENTIFIER	7	6	12		A		Left justify.
4	DEPTH INTERVAL UNITS	2	13	14		A		Left justify.
5	DEPTH INTERVAL FROM	7	15	21		N		Right justify; zero fill; Do not key decimal point; Blank if missing.
6	DEPTH INTERVAL TO	7	22	28		N		Right justify; zero fill; Do not key decimal point; Blank if missing.
7	PARAMETER	20	29	48		A		Left justify.
8	MEASUREMENT TYPE	7	49	55		A		Left justify.
9	SIGN	1	56	56		A		Values are - or blank.

KEYPUNCH INSTRUCTION

System
CANMET NATIONAL URANIUM TAILINGS PROGRAM (CANUT)

Page 11

Date 22/3/84

Instruction
BOREHOLE MEASUREMENT DATA

Instruction Number
6

Remarks This is the fifth form of 5. Each record is a fixed length of 364 characters. This form follows either the BOREHOLE SAMPLE DATA or BOREHOLE OBSERVATION DATA.

Item	Data Element	Size	Position From	Position To	Source	A/N	Punch Code	Special Instructions
10	VALUE	11	57	67		N		Right justify, zero fill; Do not key decimal point; Blank if missing.
11	UNITS	10	68	77		A		Left justify.
12	FILLER	287	78	364		A		Skip.

ATTACHMENT J: Certification of Data Validity

Golder Associates
CONSULTING GEOTECHNICAL AND MINING ENGINEERS

June 28, 1984 Our ref: 841-1020

Systemhouse Ltd.
99 Bank Street
3rd Floor
OTTAWA, Ontario
K1P 6B9

ATTENTION: Mr. A. Smith, Project Manager

RE: DATA COLLECTION FOR CANUT COMPUTER DATABASE
NATIONAL URANIUM TAILINGS PROGRAM (NUTP)

Dear Sirs:

Further to our letter of May 8, 1984, Amok Ltd. and Eldorado Resources Limited have given permission to use data sources, already in the public domain, for the database. The sources which can be used are given in the attached Tables 7 to 10, inclusive.

As requested by Mr. Smith on June 19, 1984, we have checked the computer printouts of the data for study numbers 12, 13, 14 and 15. The data has been accurately transcribed with the exceptions noted below. The exceptions are also highlighted on the computer printouts.

1) Study Data Sheet

- o The report (document) number should be entered as part of the "Study Title" so that the sample data can be easily traced, if required, to the original document.

2) Sample Data Sheet

- The borehole, probe and test pit number should be entered starting from the extreme right side such that, for example, Borehole 1 is entered as BH 00001 and not as BH 00100.

- The datum for the boreholes, probes and test pits should be referenced to a "Collar Elevation" (as per the Sample Data Sheet) rather than as a "Collar Depth".

- The coordinates of each sample identifier (Northing and Easting) should both be given to either one or two decimal places.

3) Borehole Observation Data

- Some errors in the description of the stratigraphic units originated during our entries on the "Borehole Observation Data" sheets. These errors have been corrected to reflect the descriptions on the source documents.

- It appears that the "Water Table Level" measurements shown on the computer printouts are referenced to "SP" for standpipes, "NP" for open holes and blank for "Piezometers". If this system is to be followed than it should be applied throughout.

- Some boreholes have not been entered for Study Number 12 (BH 2) and Study Number 14 (BH 901A, 902 to 904).

4) Borehole Measurement Data

- The parameters "Liquid Limit" and "Plastic Limit" have not been entered in Study No. 15, BH 00502 and BH 00510.

- The column for the value of the parameter "Hydraulic Conductivity" has been assigned 5 decimal places. This restricts values of 10^{-6} cm/sec from being entered. If the maximum number of decimal places which can be entered is to be restricted to 5 decimal places then all values 10^{-6} cm/sec should be entered as blanks, as is the case for "No Take" readings. The Study Numbers and Boreholes where the above restriction applies are as follows:

  - Study No. 12, BH 3 and 20
  - Study No. 15, BH 3, 104 and 608.

Enclosed with this letter is the updated "Golder Associates Project Man-Hour Control sheets for Weeks 21 to 24 (May 27 - June 2, June 3 - June 9, June 10 - June 16 and June 17 - June 23, 1984) inclusive, for your information.

Please note that the sixth progress billing for the month of May has not yet been sent to you. An invoice to cover the combined charges for May and June will be sent to you within the first week of July. We anticipate that a final invoice will be required early in August in order to include all disbursements such as telephone, printing and courier service charges.

We trust that this letter is sufficient for your immediate requirements. If you have any questions or if we can be of further assistance to you on this project, please do hesitate to call us.

Yours truly,
GOLDER ASSOCIATES

J.M.A. Costa, P. Eng.

JMAC/pds

encl: Tables 7 - 10, inclusive
Marked-up original computer printouts
Golder Associates Project Man-Hour Control Sheets
for Weeks 21 to 24, inclusive.

3.0 Comparison of Captured Data to Original Forms (Quality Assurance)

Printouts of the data captured by Systemhouse were sent to SENES for a quality assurance check in which the results were compared to the original documents. In total, fifteen data sources were subjected to this quality assurance measure. Table 1 is a record of the errors that were detected.

Most of the errors are of a typographical nature and easily remedied. In two instances, the title assigned to results could be modified to assist the interpretation of the data. For example, measurements of radionuclides in fish should indicate whether the concentrations refer to ash weight, wet weight or dry weight, while radon flux measurements should be designated as coming from treated or untreated tailings or local soils.

Aside from actual errors, scrutiny of the captures data raised a question which quite possibly has been adddressed previously but which may merit reconsideration. By restricting CANUT data to that measure within 20 kilometres of tailings areas valuable information may be missed. For example, concentrations of radionuclides in fish taken from the watershed adjacent to the Elliot Lake operation was useful to the evaluation of impacts on local fish but was not entered into the CANUT system because of this limitation.

In comparison, water quality data was captured for the Serpent River in and around its harbour although effluent from the nearest upstream tailings area has to travel more than forty kilometres. While some sort of "cut-off" distance may be necessary, the implications it may have on data collections hsould be carefull re-evaluated.

Table 1

ERRORS DETECTED IN MACHINE-READABLE DATA PRINTOUTS

Systemhouse Study #1 - Volume 2 of the Elliot Lake Expansion EIS

Printout Page	Description of Error
5	two values of radium-226 missed from data source (see Table C.2, page C-6)
10	delete "<" from dissolved thorium-230 value
57	incorrect dissolved thorium value
58	incorrect dissolved thorium value
71	two incorrect gross beta values
97	ten confidence interval values missed
146, 147, 148	the type of ground surface should be identified for these radon flux measurements i.e. whether on uncontaminated soil, vegetated, etc.
176	radioactivity in fish samples does not indicate that these are ash samples

Table 1 (continued)

Systemhouse Study #5 - 1976 MOE Data for the Cardiff Area

Printout Page	Description of Error
5	incorrect dissolved uranium value
32	delete "<" sign from the dissolved arsenic value

Systemhouse Study #2 - 1982 Monitoring Summary for Rabbit Lake

161	incorrect TSP value
246	"<" missing
252	incorrect nickel value
253 to 323	conductivity values were captured correctly but have not been adjusted to account for the difference between source document units and CANUT units
256	incorrect HCO_3 and CO_3 vlaues
278	incorrect chloride value

Systemhouse Study #3 - 1981 Monitoring Summary for Rabbit Lake

388 to 452	same problem with conductivity values as in Study #2

Table 1 (continued)

Systemhouse Study #4 - 1976-1980 Air Quality for Elliot Lake

Printout Page	Description of Error
168, 275	the second data entry on page 168 should be a separate entry and preceed page 275
639, 640, 641, 648, 799, 828, 854	incorrect TSP values
1015	"<" missed

Systemhouse Study #6 - 1976 MOE Data for the Bancroft Area

Printout Page	Description of Error
40	results for 15 September 1976 missed (see page 4 of this study)
67	incorrect values for undissolved gross alpha, dissolved and undissolved gross beta and dissolved uranium
68	incorrect dissolved uranium value

Systemhouse Study #7 - 1977 MOE Data for the Bancroft Area

Printout Page	Description of Error
78	results for 17 February and 1 March 1977 missed (see page 5 of this study)
88	undissolved gross beta value missed

Table 1 (continued)

Systemhouse Study #8 - 1977 MOE Data for the Cardiff Area

Printout Page	Description of Error
59	incorrect iron value
120	missing iron value and incorrect pH value
137	incorrect conductivity value
169	incorrect manganese value
171	missing manganese value
174	incorrect residue value
177	incorrect turbidity value
178	incorrect iron value
182	incorrect chromium and iron values
183	incorrect chromium value
190	incorrect iron value
197	incorrect alkalinity value
211	incorrect iron value

Table 1 (continued)

Systemhouse Study #9 - 1978 MOE Data for Cardiff Area

Printout Page	Description of Error
269	incorrect conductivity value
287	incorrect pH value
302	incorrect managanese value
316	incorrect acidity, pH and turbidity values
327	incorrect nitrogen value

Systemhouse Study #10 - 1979 MOE Data for Cardiff Area

20	incorrect managanese value
43	incorrect conductivity and manganese values
56	incorrect managnese value
63	incorrect residue and suspended residue values
67	incorrect conductivity values
72	incorrect manganese value
79	incorrect turbidity value

Table 1 (continued)

Systemhouse Study #11 - 1980 MOE Data for Cardiff Area

Printout Page	Description of Error
88	incorrect copper value, nickel value missed
93	incorrect conductivity value
102, 103, 104	these pages are duplicates of pages 78, 79 and 80

Systemhouse Study #16 - 1976 MOE Data for Bancroft Area

171	incorrect uranium value

Systemhouse Study #17 - 1981 MOE Data for Cardiff Area

248	incorrect suspended residue value

Systemhouse Study #18 - 1982 MOE Data for Cardiff Area

260	chromium and copper values missed
266	incorrect cobalt value
271	incorrect phosphorus value
280	incorrect phosphorus, sulfate and turbidity values
289	incorrect sulfate value
292	incorrect sulfate value

Table 1 (continued)

Systemhouse Study #19 - 1983 MOE Data for Cardiff Area

Printout Page	Description of Error
334	incorrect conductivity value
335	incorrect dissolved inorganic phosphorus value

Note: Printouts for Studies #12, 13, 14, 15 not received.

ATTACHMENT K: Location Numbers and UTM Co-ordinastes for Various Locations Within Tailings Sites.

Location Number is the last five characters of the Reference Identifier. The first two characters are the tailings site code followed by a three character sequence number.

TAILINGS SITE - NORDIC ZONE -17 CODE - 01

Sequence #	Name/Location	Qualifier	Easting	Northing
001	Nordic No. 1	DEFAUL	378000	5138000
002	Nordic Tailings Area	DEFAUL	378000	5138000
003	Buckles Creek	1000	378000	5136800
004	Buckles Creek - At Hwy 108 (N-12)	50	377150	5136600
005	Buckles Creek - Inlet to Nordic	50	376650	5135650
006	Buckles Creek - (N-13)	50	378700	5137500
007	Esten Lake - Western Bay	500	369500	5134500
008	McCarthy Lake - West End	50	385700	5131475
009	McCarthy Lake - South End	50	388450	5129100
010	Nordic Lake - Centre	200	376700	5135450
011	Nordic Lake - Outlet	50	375950	5134500
012	Nordic Lake - Creek at North-West Corner	50	376200	5135900
013	Nordic Tailings Effluent	100	377600	5137300
014	Porridge Lake	500	374700	5136900
015	McCarthy Lake - Outlet	50	389050	5128400
016	Serpent River - At Hwy 17	50	383350	5118400
017	McCarthy Lake - East of Serpent River	1000	388500	5131000
018	Elliot Lake - West End	500	366500	5138500
019	Elliot Lake	3000	369000	5139000
020	Town of Elliot Lake - MTC Garage	100	373700	5137700
021	Town of Elliot Lake - Westview Crescent	500	372500	5138500
022	Town of Elliot Lake - Municipal Supply	100	372000	5138450
023	Elliot Lake - Near Municipal Intake	100	372100	5138700
024	Town of Elliot Lake - Hillside Drive	1000	372500	5137500
025	Nordic Tailings (South)	500	377700	5137650
026	Town of Elliot Lake - Kilborn Way	100	373700	5137700
027	Town of Elliot Lake - Roman Ave.	100	372900	5137700
028	Nordic Tailings (SE)	50	378900	5137700
029	Nordic Townsite	200	378750	5136950
030	Nordic Lab	DEFAUL	378000	5138000

TAILINGS SITE - MILLIKEN ZONE - 17 CODE - 03

Sequence #	Name/Location	Qualifier	Easting	Northing
001	Sheriff Lake	DEFAUL	375000	5140000

TAILINGS SITE - STANLEIGH

ZONE - 17

CODE - 04

Sequence#	Name/Location	Qualifier	Easting	Northing
001	Crotch Lake - (CL-1)	50	375900	5142000
002	Crotch Lake - Outlet (CL-4)	50	377900	5141500
003	Hough Lake - Centre	100	385300	5140350
004	McCabe Lake - Centre	50	379825	5142000
005	Pecors Lake - Inlet (SR-2)	50	384800	5138650
006	Pecors Lake - Outlet (SR-3)	50	389400	5136400
007	Crotch Lake - (CL-2)	50	376500	5141700
008	Crotch Lake #1	50	376150	5141850
009	Crotch Lake #2	50	376050	5141450
010	Crotch Lake #3	50	375725	5141700

TAILINGS SITE - PRONTO ZONE - 17 CODE - 05

Sequence#	Name/Location	Qualifier	Easting	Northing
001	Pronto Tailings Effluent (PR-1)	50	368900	5117850
002	Serpent Harbour - Hospital Point	50	370600	5117450
003	Serpent River - Harbour	1000	372500	5117500
004	Serpent Harbour - Morrison Island Area	100	372400	5117500

TAILINGS SITE - QUIRKE ZONE - 17 CODE - 06

Sequence #	Name/Location	Qualifier	Easting	Northing
001	Quirke - No. 1	DEFAUL	372500	5151500
002	Quirke Tailings Area	DEFAUL	372500	5151500
003	Camp Lake - South End	50	369600	5148750
004	Dunlop Lake - Outlet (D-4, Q-14)	50	373300	5148700
005	Dunlop Lake - East End	500	373000	5149000
006	Quirke Lake - Centre West	500	378500	5149500
007	Quirke Lake - Inlet	50	377550	5151750
008	Quirke Tailings Effluent (Q-3)	50	373300	5151400
009	Quirke Tailings Effluent (Q-4)	50	373150	5151400
010	Quirke Tailings Effluent (between Q-3 and Q-4)	50	373220	5151400
011	Quirke Tailings Effluent (Q-5)	50	373000	5151400
012	Quirke Tailings Effluent (Q-6)	50	373500	5151450
013	Quirke Townsite	150	374300	5151750
014	Quirke No. 2	100	372500	5151850
015	Quirke No. 3	100	369750	5151100

TAILINGS SITE - PANEL ZONE - 17 CODE - 07

Sequence #	Name/Location	Qualifier	Easting	Northing
001	Panel Tailings Effluent - South Area (P-3)	50	383100	5152300
002	Panel Tailings Effluent - Strike Lake (P-2)	50	382350	5152900
003	Quirke Lake - Southeast Bay	500	382500	5147450
004	Quirke Lake - Centre South	500	381000	5149000
005	Quirke Lake - Centre	1000	381000	5149500
006	Quirke Lake - Outlet (SR-1)	50	385725	5149050
007	Rochester Creek (P-1)	50	383100	5150450
008	Whiskey Lake - South End	500	396300	5140000
009	Quirke Lake - Centre North	500	381000	5150000
010	Panel No. 1	50	381700	5152075
011	Panel No. 2	50	381025	5152450

TAILINGS SITE - STANROCK ZONE - 17 CODE - 08

Sequence#	Name/Location	Qualifier	Easting	Northing
001	Stanrock - No.1	DEFAUL	381500	5147000
002	Stanrock Tailings Area	DEFAUL	381500	5147000
003	Quirke Lake - Southwest Bay	500	379500	5147000
004	Stanrock Tailings (East)	50	381950	5146900
005	Stanrock Tailings (NW)	50	380800	5147300
006	Stanrock Tailings (SE)	50	381800	5146400
007	Stanrock Tailings (South)	50	381350	5146500
008	Station A - Southern Edge of Stanrock Tailings	100	381800	5146400
009	Station B - Eastern Edge of Stanrock Tailings	100	382000	5146800
010	Station C - Northwestern Corner of Stanrock Tailings	100	380800	5147300
011	Stanrock - No.2	50	382100	5146750
012	Stanrock - No.3	50	380750	5147250

TAILINGS SITE - SPANISH AMER   ZONE - 17   CODE - 09

Sequence #	Name/Location	Qualifier	Easting	Northing
001	Olive Lake - Centre	100	377400	5147450

TAILINGS SITE - DENISON

ZONE - 17 CODE - 10

Sequence#	Name/Location	Qualifier	Easting	Northing
001	Long Lake - Denison Tailings Area	DEFAUL	376500	5149000
002	Williams Lake - Denison Tailings Area	DEFAUL	376500	5149000
003	Long Lake Tailings Area - Effluent (D-1)	50	374500	5148900
004	Stollery Lake - Outlet (D-2)	50	374250	5149550
005	Long Lake - Settling Basin	100	347500	5149000
006	Williams Lake (D-3)	50	374250	5150000
007	Denison Townsite (includes Hut #14)	200	376850	5150400
008	Esker Camp	200	373800	5150900
009	Stollery Camp	100	373500	5148500
010	Bear Cub & Long Lake Tailings - A	DEFAUL	376500	5149000
011	Bear Cub & Long Lake Tailings - B	DEFAUL	376500	5149000
012	Bear Cub & Long Lake Tailings - C	DEFAUL	376500	5149000
013	Denison No.1	100	376300	5149800
014	Denison No.2	100	377300	5148275
015	Denison No.3	100	374650	5149000

TAILINGS SITE - BICROFT		ZONE - 17	CODE - 12	
Sequence#	Name/Location	Qualifier	Easting	Northing
001	Deer Creek Downstream of Bicroft Tailings	100	733800	4985900
002	Paudash Lake at Mouth of Deer Creek to Inlet Bay	100	734400	4985175
003	Centre Lake Outlet at Hwy 121	100	732100	4987550
004	Deer Creek ast Hwy 648 (north of 121)	50	730050	4988950
005	Centre Lake North of Hwy 121	100	732550	4987500
006	Bicroft Dam	50	733400	4985750
007	Colborne Creek at Hwy 648	50	727350	4984800
008	Paudash Lake Narrows at Paudash Lake Road	50	733450	4982550
009	Bicroft Water Supply - Intake at Centre Lake	100	733450	4987350
010	Auger Lake Downstream of Tailings Dam	50	732950	4986450
011	Deer Creek Tributory Downstream of Bicroft Mines Area	25	733700	4986150
012	Bicroft Water Supply Pump House			
013	Bicroft Water Supply-House Near Inlet Bay	100	733800	4985700
014	Cardiff Subdivision Water Supply-Well	500	735250	4986850
015	North of Bicroft Tailings Area, South of Hwy 121	100	732550	4987050
016	Duke Dug Well - Paudash Lake Area			
017	Bailey Drilled Well - Paudash Lake Area			
018	McConnell Dug Well - Paudash Lake Area			
019	McAndrew Drilled Well - Paudash Lake Area			
020	Silent Lake Provincial Park - Well I			
021	Downstream of Washed Out Dam, Tailings Area Tributory to Deer Creek	200	733750	4986100
022	Upstream of Washed Out Dam, Tailings Area Tributory to Deer Creek	200	732800	4986650
023	Upstream of Sand Dam Tailings Area Southwest of Bicroft Mine	100	733500	4986400
024	Downstream of Sand Dam Tailings Area Southwest of Bicroft Dam	100	733750	4985900
025	Paudash Lake South of West End of Johnston Island	50	736450	4983750

026	Paudash Lake North of Ransom Point	50	734650	4982350
027	Paudash Lake Southeast of Stringer Island	50	732300	4983100
028	Silent Lake Picnic Area - Well			
029	Town of Cardiff	500	735300	4987000
030	Centre Lake - Rod and Gun Club			
031	Auger Lake Tailings Dam	100	732600	4986750
032	Well 2 - Silent Lake Park			
033	Well 3 - Silent Lake Park			
034	Tap Water - Silent Lake Picnic Area			
035	Mancini Well, #460 Paudash Lake			
036	The Anchorage Well #497 Paudash Lake			
037	Lang Well #95 Paudash Lake			
038	Heath Well #228 Paudash Lake			
039	Paudash Shores Cottage Association Communal Well, Lewis Road			
040	Inlet Bay - West of Narrows	100	733600	4984100
041	Silent Lake Picnic Area - Lake by Dock			
042	Proposed Water Supply for Bicroft (New Drilled Well)			

TAILINGS SITE - DYNO

ZONE - 17 CODE -13

Sequence#	Name/Location	Qualitier	Easting	Northing
001	Farrel Creek Downstream of Dyno Tailings at Hwy 648	50	729000	4980200
002	Eels Lake	1000	727050	4974350
003	Upstream of Dyno Dam	50	729050	4981550
004	Downstream of Dyno Dam	100	729000	4980250
005	Farrel Creek at Dyno Road	50	728955	4980150
006	Homestead Trailer Park			
007	Well 32 ast Dyno Estates	500	728950	4981200
008	Eels Lake at North End Near Inlet from Farrel	50	728200	4973950
009	Eels Lake Middle of North End	50	728350	4978450
010	Eels Lake Middle of South End	100	726850	4873950
011	Dyno Dam	100	732950	4981200

TAILINGS SITE - FARADAY

		ZONE - 18	CODE - 14	
Sequence#	Name/Location	Qualitier	Easting	Northing
001	Bow Lake South End at Hwy 28	100	268600	4987350
002	Bentley Creek Upstream of Faraday Tailings	100	279350	4989350
003	Bentley Creek Downstream of Faraday Tailings	100	269600	4989600

TAILINGS SITE - RABBIT LAKE ZONE - 13 CODE - 24

Sequence#	Name/Location	Qualifier	Easting	Northing
001	Station #1 - (0.5 Km SE of Mill)	50	576050	6450500
002	Station #2 - (1.5 Km E of Mill)	50	577150	6450800
003	Station #4 - (1.5 Km N of Mill)	50	575700	6452350
004	Station #6 - (1.5 Km S of Mill)	50	575700	6449300
005	Downstream of Airport Road (S-0)	50	576700	6451800
006	Sedimentation Dam (S-1)	50	577150	6452000
007	Pow Bay (S-2)	50	582000	6454000
008	Horseshoe Lake (S-3)	50	575200	6445350
009	Hidden Bay (S-4)	50	575350	6442000
010	Parks Lake at North End (S-5)	200	578250	6447800
011	Inflow Delta to Pow Bay (S-6)	50	579550	6452750
012	North Drainage Ditch (1.1) - (East of Mine and Upstream of Confluence)	50	576200	6451800
013	South Drainage Ditch (1.2) - (East of Mine and Upstream of Confluence)	50	576400	6451650
014	Station #3 - (0.5 Km W of Mill)	50	575150	6450800
015	Station #7 - (2.5 Km SW of Mill)	50	573850	6449050
016	Station #8 - (2.5 Km SE of Mill)	50	577450	6449050
017	Sedimentation Dam - At Overflow Side	50	577700	6452050
018	Horseshoe Lake Outflow (3.1)	50	575050	6445150
019	Parks Lake - Near Outflow (3.6)	50	577350	6444600
020	SO2 Lake #100	50	579850	6448850
021	SO2 Lake #200	50	579350	6445050
022	SO2 Lake #300	50	574600	6449350
023	SO2 Lake #400	50	572750	6450200
024	SO2 Lake #500	50	574100	6453500
025	SO2 Lake #600	50	577900	6455200
026	SO2 Lake #700	50	575250	6452400
027	Tailings Pond - At Discharge Pipe to Pond (P)	50	577400	6448000
028	Precipitation Pond Outflow (2.3)	50	576150	6446350
029	Groundwater Well C - At North Dam	50	577450	6448200

ATTACHMENT L: Borehole Reference Identifiers

SITE: PANEL

BOREHOLE REFERENCE IDENTIFIERS

Sequence#	Location/Description	Northing	Easting
001	Borehole in Area of Dam B	113099	179623
002	Borehole in Area of Dam B	113148	179608
003	Borehole in Area of Dam E	113843	177579
004	Borehole in Area of Dam B	113169	179750
005	Borehole in Area of Dam B	113127	179852
006	Borehole in Area of Dam D	111227	176550
007	Borehole in Area of Dam A	111091	179019
008	Borehole in Area of Dam D	111329	176493
009	Borehole in Area of Dam A	111049	179166
010	Borehole in Area of Dam C	110854	182238
011	Borehole in Area of Dam C	110759	182233
012	Borehole in Area of Dam B	113102	179279
013	Borehole in Area of Dam B	112948	179227
014	Borehole in Area of Dam B	112889	179264
015	Borehole in Area of Dam B	112769	179337
016	Borehole in Area of Dam C	110665	182218
017	Borehole in Area of Dam C	110969	182253
018	Borehole in Area of Dam F	109092	178151
019	Borehole in Area of Dam F	108937	177893
020	Borehole in Area of Dam E	113935	177415
021	Borehole in Area of Dam B	113112	180046
022	Borehole in Area of Dam B	113018	179746
023	Borehole in Area of Dam M	110108	178615
024	Borehole in Area of Dam M	110072	178540
025	Borehole in Area of Dam B	112955	179110
026	Borehole in Area of Dam B	112850	179115
027	Borehole in Area of Dam B	112915	179125
028	Borehole in Area of Dam B	112920	179175
029	Borehole in Area of Dam B	112950	179400
030	Borehole in Area of Dam B	113085	179555
031	Borehole in Area of Dam B	113000	179485

SITE: PANEL (cont'd)

Sequence#	Location/Description	Northing	Easting
032	Borehole in Area of Dam B	112880	179475
033	Borehole in Area of Dam B	112990	179375
034	Borehole in Area of Dam B	113065	179435
035	Borehole in Area of Dam B	113146	179516
036	Borehole in Area of Dam B	113040	179775
037	Test Pit in Area of Potential Borrow Area	16170	176300
038	Test Pit in Area of Potential Borrow Area	17315	174980
039	Test Pit in Area of Potential Borrow Area	17225	175700
040	Test Pit in Area of Potential Borrow Area	16850	176710
041	Test Pit in Area of Potential Borrow Area	16780	176905
042	Test Pit in Area of Potential Borrow Area	17085	176185
043	Test Pit in Area of Potential Borrow Area	112480	175565
044	Probe Hole in Area of Dam M	110045	178475
045	Probe Hole in Area of Dam M	110060	178510
046	Probe Hole in Area of Dam M	110068	178530
047	Probe Hole in Area of Dam M	110078	178555
048	Probe Hole in Area of Dam M	110090	178575
049	Probe Hole in Area of Dam M	110098	178596
050	Probe Hole in Area of Dam M	110110	178625
051	Probe Hole in Area of Dam M	110118	178645
052	Probe Hole in Area of Dam M	110130	178670
053	Probe Hole in Area of Dam M	110145	178700

QUIRKE (MANFRED LAKE)

Sequence#	Location/Description	Northing	Easting
001	Borehole in Area of Dam J	105745	143480
002	Borehole in Area of Dam J	105758	143435
003	Borehole in Area of Dam J	105500	143760
004	Borehole in Area of Dam J	105765	143810
005	Borehole in Area at Dam J	105660	143760
006	Borehole in Area at Dam J	105625	143770
007	Borehole in Area of Dyke #1	108282.62	147204.5
008	Borehole in Area ot Dyke #1	108193.80	146820.9
009	Borehole in Area of Dyke #2	108077.92	146325.58
010	Borehole in Area of Dam D	108475.77	147882.95
011	Borehole in Area of Dam D	108598.72	147885.15
012	Borehole in Area of Dam D	108517.68	147725.19
013	Borehole in Area of Dam D	108637.00	148311.73
014	Borehole in Area of Dam D	108610.35	148619.78
015	Borehole in Area of Dam E	108590.73	149238.4
016	Borehole in Area of Dyke #2	107733.99	146529.32
017	Borehole in Area of Main Dyke	107578.70	145411.4
018	Borehole in Area of Main Dyke	107430.06	144351.0
019	Borehole in Area of Main Dam	108351.10	147489.0
020	Borehole in Area of Main Dam	108581.47	147403.46
021	Borehole in Area of Dam A	107359.97	140882.01
022	Borehole in Area of Dam A	107483.76	140897.15
023	Borehole in Area of Dam B	107878.00	141171.53
024	Borehole in Area of Dam B	107939.45	141250.29
025	Borehole in Area of Dam K1	107490.96	140123.24
026	Borehole in Area of Dam K1	107588.16	140199.56
027	Borehole in Area of Dam K1	107369.00	140111.22
028	Borehole in Area of Dam K1	107488.12	140217.33
029	Borehole in Area of Main Dam	108420.00	147312.00
030	Borehole in Area of Duke #1	108365.00	147210.00
031	Borehole in Area of Main Dam	108430.00	147610.00
032	Borehole in Area of Main Dam	108325.00	147512.00
033	Borehole in Area of Main Dam	108660.00	147305.00

QUIRKE (MANFRED LAKE) (cont'd)

Sequence#	Location/Description	Northing	Easting
034	Borehole in Area of Dam A	107465.00	140895.00
035	Borehole in Area of Channel A	107180.00	140122.00
036	Borehole in Area of Dam K1	107600.00	140062.00
037	Borehole in Area of Dam A	107402.00	140900.00
038	Borehole in Area of Dam K1	107360.00	140450.00
039	Borehole in Area of Dam K1	107395.00	140135.00
040	Borehole in Area of Dam B	107882.00	141160.00
041	Borehole in Area of Dam K1	107495.00	140470.00
042	Borehole in Area of Dam K1	107275.00	140510.00
043	Borehole in Area of Dam K1	107675.00	140440.00

ATTACHMENT M - MASTER DESCRIPTION OF DATA RECORD LAYOUTS

```
        DATASET: CNT01MP.MASTER.DATA                                              DATE: 04/07/25
        MEMBER:  CANUT                         LEVEL:  01.05                       TIME: 17:41
                                               USERID: CNT01MP                     PAGE  01 OF 02
START                                                                                             MOD
 COL    ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8  FLAGS

   1    FILE=CANUT,SUFFIX=FIX,$                                            00010000
   2     SEGNAME=STUDY                                                     00020000
   5        FIELD=RECTYPE,1,A1,A1,$                                        00030000
   5        FIELD=STUDY_ID,,A4,A4,$                                        00040000
   5        FIELD=PUBLISH_YEAR,,A4,A4,$                                    00050000
   5        FIELD=MAIN_SPONSOR,,A25,A25,$                                  00060000
   5        FIELD=STUDY_DESC,,A35,A35,$                                    00070000
   5        FIELD=STUDY_TITLE1,,A80,A80,$                                  00080000
   5        FIELD=STUDY_TITLE2,,A80,A80,$                                  00090000
   5        FIELD=STUDY_TITLE3,,A80,A80,$                                  00100000
   2     SEGNAME=SAMPLE,PARENT=STUDY                                       00110000
   5        FIELD=RECTYPE,2,A1,A1,$                                        00120000
   5        FIELD=TAILING_SITE,,A12,A12,$                                  00130000
   5        FIELD=STUDY_ID2,,A4,A4,$                                       00140000
   5        FIELD=SAMPLE_ID,,A7,A7,$                                       00150000
   5        FIELD=REFERENCE_ID,,A12,A12,$                                  00160000
   5        FIELD=YEAR_FROM,,A2,A2,$                                       00170000
   5        FIELD=MONTH_FROM,,A2,A2,$                                      00180000
   5        FIELD=DAY_FROM,,A2,A2,$                                        00190000
   5        FIELD=HOUR_FROM,,A2,A2,$                                       00200000
   5        FIELD=MIN_FROM,,A2,A2,$                                        00210000
   5        FIELD=SEC_FROM,,A2,A2,$                                        00220000
   5        FIELD=YEAR_TO,,A2,A2,$                                         00230000
   5        FIELD=MONTH_TO,,A2,A2,$                                        00240000
   5        FIELD=DAY_TO,,A2,A2,$                                          00250000
   5        FIELD=HOUR_TO,,A2,A2,$                                         00260000
   5        FIELD=MIN_TO,,A2,A2,$                                          00270000
   5        FIELD=SEC_TO,,A2,A2,$                                          00280000
   5        FIELD=DUR_YY,,A2,A2,$                                          00290000
   5        FIELD=DUR_MM,,A2,A2,$                                          00300000
   5        FIELD=DUR_DD,,A2,A2,$                                          00310000
   5        FIELD=DUR_HH,,A2,A2,$                                          00320000
   5        FIELD=DUR_MN,,A2,A2,$                                          00330000
   5        FIELD=DUR_SS,,A2,A2,$                                          00340000
   5        FIELD=QUALIFIER,,A6,A6,$                                       00350000
   5        FIELD=EASTING1,,A6,A6,$                                        00360000
   5        FIELD=EASTING2,,A1,A1,$                                        00370000
   5        FIELD=NORTHING1,,A7,A7,$                                       00380000
   5        FIELD=NORTHING2,,A1,A1,$                                       00390000
   5        FIELD=ZONE,,A2,A2,$                                            00400000
   5        FIELD=LATITUDE1,,A2,A2,$                                       00410000
   5        FIELD=LATITUDE2,,A5,A5,$                                       00420000
   5        FIELD=LONGITUDE1,,A3,A3,$                                      00430000
   5        FIELD=LONGITUDE2,,A5,A5,$                                      00440000
   5        FIELD=SAMPLE_ELEV1,,A4,A4,$                                    00450000
   5        FIELD=SAMPLE_ELEV2,,A2,A2,$                                    00460000
   5        FIELD=SAMPLE_DPTH1,,A4,A4,$                                    00470000
   5        FIELD=SAMPLE_DPTH2,,A2,A2,$                                    00480000
   5        FIELD=ED_UNITS,,A4,A4,$                                        00490000
   5        FIELD=N1_TREATMNT,,A1,A1,$                                     00500000
   5        FIELD=N2_TREATMNT,,A1,A1,$                                     00510000
   5        FIELD=N3_TREATMNT,,A1,A1,$                                     00520000
   5        FIELD=SAMPLE_DESC,,A35,A35,$                                   00530000
   5        FIELD=LOCATION1,,A100,A100,$                                   00540000
```

```
         DATASET: CNT01MP.MASTER.DATA                                          DATE  84/07/25
         MEMBER:  CANUT                      LEVEL:  01.05                     TIME  17:41
                                             USERID: CNT01MP                   PAGE  02 OF 03
START                                                                                         MOD
 COL     ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8    FLAGS

  5          FIELD=LOCATION2,,A100,A100,$                                          00550000
  2        SEGNAME=MEASURE,PARENT=SAMPLE                                           00560000
  5          FIELD=RECTYPE,3,A1,A1,$                                               00570000
  5          FIELD=STUDY_ID3,,A4,A4,$                                              00580000
  5          FIELD=SAMPLE_ID3,,A7,A7,$                                             00590000
  5          FIELD=PARAMETER,,A20,A20.$                                            00600000
  5          FIELD=MEASURE_TYPE,,A7,A7,$                                           00610000
  5          FIELD=DETECT_LIMIT,,A1,A1,$                                           00620000
  5          FIELD=SIGNA,,A1,A1,$                                                  00630003    *
  5          FIELD=VALUE1,,A6,A6,$                                                 00640000
  5          FIELD=VALUE2,,A5,A5,$                                                 00650000
  5          FIELD=VALUE_EXP,,A3,A3,$                                              00660000
  5          FIELD=CONFIDENCE1,,A6,A6,$                                            00670000
  5          FIELD=CONFIDENCE2,,A5,A5,$                                            00680000
  5          FIELD=CONFID_EXP,,A3,A3,$                                             00690000
  5          FIELD=UNITS,,A10,A10.$                                                00700000
  2        SEGNAME=B_SAMPLE,PARENT=STUDY                                           00710000
  5          FIELD=RECTYPE,1,A1,A1,$                                               00720000
  5          FIELD=B_TAILINGS,,A12,A12,$                                           00730000
  5          FIELD=STUDY_ID4,,A4,A4,$                                              00740000
  5          FIELD=SAMPLE_ID4,,A7,A7,$                                             00750000
  5          FIELD=B_REFERENCE,,A12,A12.$                                          00760000
  5          FIELD=B_SAMP_YEAR,,A2,A2,$                                            00770000
  5          FIELD=B_SAMP_MNTH,,A2,A2.$                                            00780000
  5          FIELD=B_SAMP_DAY,,A2,A2,$                                             00790000
  5          FIELD=B_SAMP_DESC,,A35,A35.$                                          00800000
  5          FIELD=B_COLLAR1,,A4,A4,$                                              00810000
  5          FIELD=B_COLLAR2,,A2,A2,$                                              00820000
  5          FIELD=B_INCLINE,,A3,A3,$                                              00830000
  5          FIELD=B_AZIMUTH,,A3,A3,$                                              00840000
  5          FIELD=B_LENGTH1,,A5,A5,$                                              00850005    **
  5          FIELD=B_LENGTH2,,A2,A2,$                                              00860000
  5          FIELD=B_CL_UNITS,,A10,A10,$                                           00870000
  5          FIELD=MINE_GRIDN1,,A6,A6,$                                            00880000
  5          FIELD=MINE_GRIDN2,,A2,A2,$                                            00890000
  5          FIELD=MINE_GRIDE1,,A6,A6.$                                            00900005    **
  5          FIELD=MINE_GRIDE2,,A1,A1,$                                            00910005    **
  5          FIELD=B_LOCATION1,,A100,A100.$                                        00920000
  5          FIELD=B_LOCATION2,,A100,A100,$                                        00930000
  2        SEGNAME=B_OBSERV,PARENT=B_SAMPLE                                        00940000
  5          FIELD=RECTYPE,5,A1,A1,$                                               00950000
  5          FIELD=STUDY_ID5,,A1,A4.$                                              00960000
  5          FIELD=SAMPLE_ID5,,A7,A7,$                                             00970000
  5          FIELD=BO_DI_UNITS,,A2,A2.$                                            00980000
  5          FIELD=BO_DPTH_FR1,,A5,A5,$                                            00990000
  5          FIELD=BO_DPTH_FR2,,A2,A2.$                                            01000000
  5          FIELD=BO_DPTH_TO1,,A5,A5,$                                            01010000
  5          FIELD=BO_DPTH_TO2,,A2,A2,$                                            01020000
  5          FIELD=BO_MTYPT,,A7,A7,$                                               01030000
  5          FIELD=B_OBSERVATN,,A20,A20.$                                          01040000
  2        SEGNAME=BMEASURE,PARENT=B_SAMPLE                                        01050002    *
  5          FIELD=RECTYPE,6,A1,A1,$                                               01060000
  5          FIELD=STUDY_ID6,,A4,A4.$                                              01070000
  5          FIELD=SAMPLE_ID6,,A7.A7.$                                             01080000
```

```
      DATASET: CNT01MF.MASTER.DATA                                          DATE  04/07/25
      MEMBER:  CANUT                     LEVEL:  01.05                      TIME  17:41
                                         USERID: CNT01MF                    PAGE  03 OF 03
START                                                                                        MOD
 COL  ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8      FLAGS

  5       FIELD=BM_DI_UNITS,,A2,A2,$                                         01090000
  5       FIELD=BM_DPTH_FR1,,A5,A5,$                                         01100000
  5       FIELD=BM_DPTH_FR2,,A2,A2,$                                         01110000
  5       FIELD=BM_DPTH_TO1,,A5,A5,$                                         01120000
  5       FIELD=BM_DPTH_TO2,,A2,A2,$                                         01130000
  5       FIELD=BM_PARAMETER,,A20,A20,$                                      01140000
  5       FIELD-BM_MTYPE,,A7,A7,$                                            01150000
  5       FIELD-BM_VALUE1,,A7,A7,$                                           01160004     *
  5       FIELD-BM_VALUE2,,A5,A5,$                                           01170000
  5       FIELD-BM_UNITS,,A10,A10,$                                          01180000
```

ATTACHMENT N - DATA COLLECTION PROCEDURES MANUAL CONTENTS

During the course of this contract, a data collection procedures manual was prepared which outlines the steps to take in order to convert data to a computer readable media. Since the manual contains several of the attachments already provided in this report, it would be redundant to include those sections again. Therefore, wherever an attachment would normally appear in this document, a page has been inserted which references the attachment.

ENERGY MINES AND RESOURCES CANADA
CANMET, NATIONAL URANIUM TAILINGS PROGRAM

PROCEDURES
FOR
CANUT DATA COLLECTION

Mary Geberdt
Systemhouse Ltd.
April, 1984

TABLE OF CONTENTS

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AN OVERVIEW ON THE DATA COLLECTION

The National Uranium Tailings Program requires data related to uranium tailings to be captured and placed on their database. Senes Consulting in Toronto, has identified sources for the environmental data. These sources include environmental reports or studies produced by government agencies, universities and other private organizations. Golder Associates, also situated in Toronto, have identified Borehole related data and have been transcribing this data themselves.

The collection of data can be broken down into the following components.

1. Encoding data from the studies received from Senes;
2. Checking the borehole data encoded by Golder Associates;
3. Sending the forms out to be keyed;
4. Producing computer reports from the keyed data;
5. Sending the studies with the corresponding computer reports to Senes for quality assurance checking;
6. Loading the verified data onto the data base.

All of the components are described in the remainder of this guide.

Procedures for Encoding Data

Refer to Attachment G.

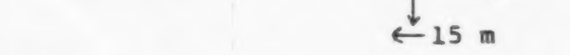
PROCEDURE TO CHECK ENCODED BOREHOLE DATA PRIOR TO KEYING

Golder Associates is transcribing the Borehole data from studies they have. We will be receiving the completed forms. Our job is to add the missing codes for Reference Identifier and Measurement Type.

The Study Ids should be recorded on our list of studies received. If their Study Id duplicates an existing one, it must be assigned a unique number. Please record any such changes.

The Borehole data is captured differently from other data. The Sample data is actually borehole information. Each borehole has many samples. A sample is identified by the depth interval in the measurement data. Jorge Costa of Golder explained the methods for gathering borehole samples. These are the important points.

- There will never be replicate samples from a borehole.
- Measurement depth intervals will never overlap so that each interval uniquely identifies a sample.
- Observation depth intervals will extend over one or more samples and probably over parts of a sample. The following diagram illustrates this.



PROCEDURE FOR SENDING FORMS TO BE KEYED

Systemhouse has contracted D.E. Systems to key the data collection forms and to spool off the data onto tape. Our contact with D.E. Systems is Fran Pearson, Director of Technical Services. Attached is her business card. She has received a set of keypunch instructions with samples of the data collection forms. See attached.

Send a batch of forms to be keyed when you have completed one or more studies. Try not to send more than 300 samples in a batch. The exception would be a study that contains more than 300 samples. Study information cannot be split up.

Complete these steps when sending a batch to be keyed.

1. Record the number of samples in each study sent to D.E. Systems.

2. Notify Fran Pearson.

3. Arrange for a courier to deliver the forms to D.E. Systems.

4. Clearly label the box of forms with the address and direct it to Fran Pearson.

Keypunch Instructions and Sample Data Transcription forms can be found in Attachments H and F respectively.

PROCEDURES TO PRODUCE REPORTS ON THE COLLECTED DATA

Step 1 Take the tape received from D.E. Systems to the tape library at the Computer Science Centre. This is done through the Job Submission window. Give the operator at the window the IBM account number and your name. The volume serial number will be the one assigned by D.E. Systems. Check the label for DEL and a three digit sequence number. NOTE: record the volume serial number for your own use. It will be required when you produce the report.

Wait at least half an hour before submitting the reports. It usually takes that long for the tape library to clean the tape and have it ready for use.

Step 2 Logon to an IBM 3278 terminal by entering:

```
TSO userid
```

You will use the IBM userid assigned to the National Uranium Tailings Program.

Step 3 You will be presented with a screen containing the account information. The cursor will be positioned at the field for PASSWORD. Enter in the password for the userid here.

Step 4 The system will come back with READY after the logon messages. Here you will enter the command "REPORT". This starts the procedure which will produce the reports.

PROCEDURES TO PRODUCE REPORTS ON THE COLLECTED DATA (cont'd)

Step 5 The procedure will display the following on the screen

```
CANUT DATA COLLECTION REPORT PROCEDURE
        YY/MM/DD       HH:MM:SS

THIS PROCEDURE PRODUCES FORMATTED REPORTS OF
THE DATA COLLECTED FROM VARIOUS STUDIES FOR
THE CANMET NATIONAL URANIUM TAILINGS PROGRAM.

PLEASE ENTER THE TAPE VOLSER FOR THE CANUT DATA ==
```

Here you will enter the volume serial number for the tape received from D.E. Systems. This is the tape of data keyed from a batch of data capture forms.

Step 6 Once you have entered the volume serial number, the procedure will echo it. This gives you an opportunity to correct a possible error. The procedure displays this message

```
YOU HAVE ENTERED "   ".  IS THIS CORRECT? (Y/N) ==
```

If the volume serial is correct, then enter: Y. The procedure then submits the batch job to run the reports. A message will be displayed to indicate that the job was submitted.

If the volume serial is incorrect, then enter: N. The procedure will then return you to step 5 where you can continue by entering the correct volume serial number.

PROCEDURES TO PRODUCE REPORTS ON THE COLLECTED DATA (cont'd)

Step 7 At this point, you have completed the submission of reports. The system will again be at the READY state. To exit from the TSO session, enter: LOGOFF.

Step 8 When the job to produce the reports is finished, it will be printed at the Computer Science Centre. Allow about an hour before you pick up the reports. Ask at the Job Submission window for listings with the IBM userid.

PROCEDURE FOR SENDING REPORTS FOR VERIFICATION

To ensure quality assurance on the capture of data, Senes will verify the studies they have submitted. They will compare the studies to corresponding computer reports of the keyed data. So we must send to Senes the following pieces of information:

a) the studies from which the data was transcribed;
b) the corresponding computer reports;
c) the list of data we were unable to transcribe.

This package will be sent by courier to:

Brett Ibbotson
Senes Consulting Ltd.
499 McNicoll Avenue
Willowdale, Ont. M2H 2C9.

Note: The borehole data will not be included with the data sent from SENES as it is being transcribed by Golder Associates. After producing reports containing borehole information, send only the computer printout to

Jorge Costa, P. Eng.
Golder Associates
3151 Wharton Way
Mississauga, Ontario
L4X 2B6

Both SENES and GOLDER will return written confirmation that the conversion of the data was successful.

PROCEDURES FOR BACKUP OF THE IBM FILES

Eventually, it will no longer be necessary to generate computer reports on the data collected. When this happens, we will backup the online files onto tape. This will save the NUT Program the cost of maintaining disk files that are not being used.

Consider these steps to backup the files.

Step 1 Logon to an IBM 3278 terminal by entering:

```
TSO userid
```

You will use the IBM userid assigned to the National Uranium Tailings Program.

Step 2 You will be presented with a screen containing the account information. The cursor will be positioned at the field for PASSWORD. Enter the password for the userid here.

Step 3 The system will come back with READY after the logon messages. Here you will enter the command "BACKUP". This initiates the procedure to backup the files.

Step 4 The backup procedure will display the following:

```
CANUT BACKUP PROCEDURE
YY/MM/DD        HH:MM:SS

THIS PROCEDURE WILL BACKUP THE FOLLOWING FILES:

CNT01MP.NUTP.CLIST         CNT01MP.NUTP.JCL
CNT01MP.MASTER.DATA        CNT01MP.FOCEXEC.DATA

DO YOU WISH TO BACKUP THESE FILES?  (Y/N) ==
```

PROCEDURES FOR BACKUP OF THE IBM FILES (cont'd)

You have a choice of either submitting the job to backup the files or not. If you enter anything other than Y, the job will not be submitted. Once you enter Y, the system will respond with a message indicating that the job has been submitted.

Step 5 You are now back into the READY mode. Enter LOGOFF to exit from TSO. A listing will be printed at the completion of the job. You can pick it up at the Job Submission counter. The last statement on the listing should be: END OF JOB - 00 WAS HIGHEST SEVERITY CODE. If the code is not zero, then there was a problem with the job. In this case, your files are not on backup. They still exist online. Contact Susan Duguay at the Computer Science Centre if you need help. There is little possibility of problems occurring.

PROCEDURES FOR RESTORING THE IBM FILES

Once the IBM files are on backup, you may require them again. To access the files online, you will have to recreate them as disk files. Follow these steps

Step 1 Logon to TSO with the National Uranium Tailings Program's IBM account. See steps 1 and 2 of the backup procedure for details.

Step 2 When the system responds to READY, enter the command: ISPF 3.2. This will bring you to the SPF utility screen.

Step 3 Key an A for the command and RECOVERY beside data set name then hit enter. This is to allocate the sequential data set CNT01MP.RECOVERY.

Step 4 You will be presented a screen showing attributes for the file you are allocating. Volume can be blank for the default. Before you hit enter, change the attributes to these.

organization	PS	directory	0
space	TRKS	record type	FB
primary	1	record length	80
secondary	1	block size	3120

Step 5 Now you have returned to the utility screen. A message will be on the top right hand corner to indicate successful allocation. Enter "=2" to get the SPF edit screen.

Step 6 Move the cursor down to DATA SET NAME and enter: RECOVERY. You will then be given a blank page to enter in data.

PROCEDURES FOR RECOVERY (cont'd)

Step 7 Enter the JCL from the attached listing. Notice that the only difference between each STEP is the data set names and the tape label number.

Step 8 Once you are satisfied that the JCL is entered correctly, enter "=X" at the command field. This will save the data set and return you to TSO.

Step 9 After the system READY, enter the command: SUB RECOVERY. This will submit the JCL you have entered to recreate the online files. The system will respond with a message stating that the job was submitted.

Step 10 Enter LOGOFF to exit from the TSO session.

Step 11 When the job finishes, the files will exist under our userid. A listing will be printed at the Computer Science Centre (CSC). It can be picked up at the Job Submission counter. Check the listing for a zero job severity code.

```
DATASET: CNTOIPP.RECOVERY                                                                                      DATE: 84/04/19
                                                                                                                TIME: 16:29
                                                                                                                PAGE: 001

GENERAL DATA:                         GENERAL DATA:                         CURRENT ALLOCATION:          CURRENT UTILIZATION:
   VOLUME SERIAL:    RES002              RECORD FORMAT:          FB                1 TRACK                      1 TRACK
   DEVICE TYPE:        3375              RECORD LENGTH:          80                1 EXTENT                     1 EXTENT
   ORGANIZATION:         PS              BLOCK SIZE:          3,120
   CREATION DATE:  84/04/16              1ST EXTENT SIZE:         1
                                         SECONDARY QUAN:          1
```

```
      DATASET: CNT0IMP.RECOVERY
                                                                                DATE: 84/04/19
                                                                                TIME: 16:29
START                                                                           PAGE: 1
 COL  ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8
   1  //CNT0IMPA JOB (CNT0IMP,258,9,9),'CNT0IMP',MSGCLASS=A,
   1  //       NOTIFY=CNT0IMP                                                    00000100
   1  //*****************************************************************       00000200
   1  //*                                                               *       00000300
   1  //* THE PURPOSE OF THIS JCL IS TO RECOVER THE FOLLOWING FILES:    *       00000400
   1  //*                                                               *       00000500
   1  //*        --FILE NAME---               -----DESCRIPTION-----     *       00000600
   1  //*          NUTP.CLIST                 CANUT CLISTS              *       00000700
   1  //*          NUTP.JCL                   CANUT JCL PROCEDURES      *       00000800
   1  //*          MASTER.DATA                FOCUS FILE DESCRIPTIONS   *       00000900
   1  //*          FOCEXEC.DATA               FOCUS PROGRAM SOURCE      *       00001000
   1  //*                                                               *       00001100
   1  //*****************************************************************       00001200
   1  //*                                                                       00001300
   1  //*****   R E C O V E R     C L I S T S   *****                           00004100
   1  //*                                                                       00004200
   1  //STEP01 EXEC PGM=IEBCOPY                                                 00004300
   1  //SYSPRINT CD SYSOUT=*                                                    00004400
   1  //INDD01    DD DSN=CNT0IMP.NUTP.CLIST.BACKUP,DISP=OLD,                    00004500
   1  //             LABEL=1,UNIT=TAPE,VOL=(,RETAIN,SER=ER3933)                 00004600
   1  //FILE01    DD DSN=CNT0IMP.NUTP.CLIST,DISP=(,CATLG,DELETE),               00004700
   1  //             UNIT=3375,SPACE=(TRK,(2,5,5)),                             00004800
   1  //             DCB=(DSORG=PO,RECFM=FB,LRECL=80,BLKSIZE=3120)              00004810
   1  //SYSIN     DD *                                                          00004820
   3    COPY OUTDD=FILE01,INDD=((INDD01,R))                                     00004900
   1  //*                                                                       00005000
   1  //*****   R E C O V E R     J C L    *****                                00005100
   1  //*                                                                       00005200
   1  //STEP02 EXEC PGM=IEBCOPY,COND=(0,NE)                                     00005300
   1  //SYSPRINT DD SYSOUT=*                                                    00005400
   1  //INDD02 DD DSN=CNT0IMP.NUTP.JCL.BACKUP,DISP=OLD,                         00005500
   1  //             LABEL=2,UNIT=TAPE,VOL=(,RETAIN,SER=ER3933)                 00005600
   1  //FILE02    DD DSN=CNT0IMP.NUTP.JCL,DISP=(,CATLG,DELETE),                 00005700
   1  //             UNIT=3375,SPACE=(TRK,(2,5,5)),                             00005800
   1  //             DCB=(DSORG=PO,RECFM=FB,LRECL=80,BLKSIZE=3120)              00005810
   1  //SYSIN     DD *                                                          00005820
   3    CCPY OUTDD=FILE02,INDD=((INDD02,R))                                     00005900
   1  //*                                                                       00006000
   1  //*****   R E C O V E R     M A S T E R   *****                           00006100
   1  //*                                                                       00006200
   1  //STEP03 EXEC PGM=IEBCOPY,COND=(0,NE)                                     00006300
   1  //SYSPRINT DD SYSOUT=*                                                    00006400
   1  //INDD03    DD DSN=CNT0IMP.MASTER.DATA.BACKUP,DISP=OLD,                   00006500
   1  //             LABEL=3,UNIT=TAPE,VOL=(,RETAIN,SER=ER3933)                 00006600
   1  //FILE03    DD DSN=CNT0IMP.MASTER.DATA,DISP=(,CATLG,DELETE),              00006700
   1  //             UNIT=3375,SPACE=(TRK,(2,5,5)),                             00006800
   1  //             DCB=(DSORG=PO,RECFM=FB,LRECL=80,BLKSIZE=3120)              00006810
   1  //SYSIN     DD *                                                          00006820
   3    COPY OUTDD=FILE03,INDD=((INDD03,R))                                     00006900
   1  //*                                                                       00007000
   1  //*****   R E C O V E R     F O C E X E C   *****                         00007100
   1  //*                                                                       00007200
   1  //STEP04 EXEC PGM=IEBCOPY,COND=(0,NE)                                     00007300
   1  //SYSPRINT DD SYSOUT=*                                                    00007400
                                                                                00007500
```

```
       DATASET: CNTOIMP.RECOVERY                                      DATE: 84/04/19
                                                                      TIME: 16:29
START                                                                 PAGE: 2
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

   1   //INDD04    DD DSN=CNTOIMP.FOCEXEC.DATA.BACKUP,DISP=CLD,                 00007600
   1   //             LABEL=4,UNIT=TAPE,VOL=SER=ER3933                          00007700
   1   //FILE04    DD DSN=CNTOIMP.FCCEXEC.DATA,DISP=(,CATLG,DELETE),            00007800
   1   //             UNIT=3375,SPACE=(TRK,(2,5,5)),                            00007810
   1   //             DCB=(DSORG=PO,RECFM=FB,LRECL=80,BLKSIZE=3120)             00007820
   1   //SYSIN     DD *                                                         00007900
   3     CCPY OUTDD=FILE04,INDD=((INDD04,R))                                    00008000
   1   /*                                                                       00008100
```

DESCRIPTION OF THE FILES COPIED TO TAPE FOR BACKUP

The files you will copy to tape are partitioned data sets (PDS) with numbers attached. There are four PDS files.

CNT01MP.NUTP.CLIST	(contains TSO CLIST files)
CNT01MP.NUTP.JCL	(contains JCL files)
CNT01MP.MASTER.DATA	(contain FOCUS file descriptions)
CNT01MP.FOCEXEC.DATA	(contains FOCUS command files)

All four of these PDS files have the same attributes.

Unit:	3375	(type of online storage)
Data set organization:	PO	(partitioned)
Record format:	FB	(fixed block)
Record length:	80	
Block size:	3120	
Space:	TRKS	(tracks)
Primary quantity:	2	
Secondary quantity:	5	(5 extents of 16 tracks)
Directory space:	5	(limit on the number of members)

Descriptions and listings of the different members are on the next few pages.

DESCRIPTION OF THE FILES COPIED TO TAPE FOR BACKUP (cont'd)

CNT01MP.NUTP.CLIST (FOCUS) - this is a CLIST set up to use FOCUS under our account. It must be present to call the FOCUS procedure.

CNT01MP.NUTP.CLIST (REPORT) - this CLIST is the procedure which initiates the computer reports. It is set up to prompt for the tape of data and submits a batch job to run the reports.

CNT01MP.NUTP.CLIST (BACKUP) - this CLIST is the procedure to backup these files. It submits a batch job which copies the files onto tape and deletes the online versions.

CNT01MP.NUTP.JCL (REPORT) - this is the IBM JCL submitted to produce the computer reports. It executes the FOCUS command file REPORT.

CNT01MP.NUTP.JCL (BACKUP) - this is the IBM JCL which copies the files to tape and deletes the online version.

CNT01MP.MASTER.DATA (CANUT) - the FOCUS file description of the tape of data. It contains the file layout for each of the record types captured on the data collection forms.

DESCRIPTION OF THE FILES COPIED TO TAPE FOR BACKUP (cont'd)

CNT01MP.FOCEXEC.DATA (REPORT)	- the FOCUS command file that produces the computer reports. It formats one sample per page with the study information and all of the measurements.

```
PROJECT: CNTOIMP
LIBRARY: NUTP                                                                                        DATE: 84/04/19
TYPE:    CLIST                                                                                       TIME: 16:28
                                                                                                     PAGE: 001
GENERAL DATA:                    GENERAL DATA:                        CURRENT ALLOCATION:
   VOLUME SERIAL:    RESD02         RECORD FORMAT:          FB             2 TRACKS               CURRENT UTILIZATION:
   DEVICE TYPE:        3375         RECORD LENGTH:          80             1 EXTENT                       1 TRACK
   ORGANIZATION:         PO         BLOCK SIZE:          3.120            10 DIRECTORY BLOCKS             1 EXTENT
   CREATION DATE: 84/04/16          1ST EXTENT SIZE:         2                                            1 DIRECTORY BLOCK
                                    SECONDARY QUAN:          5                                            3 MEMBERS

 MEMBER         VERS.MOD       CREATION        DATE AND TIME        CURRENT        INITIAL        MODIFIED        USER
  NAME           LEVEL           DATE          LAST MODIFIED       NO. LINES      NO. LINES      NO. LINES         ID

BACKUP           01.06         84/04/04      84/04/19   16:26         33             41             22          CNTOIMP
FOCUS            01.05         84/01/12      84/03/23   09:42         30             26             30          CNTOIMP
REPORT           01.14         84/04/03      84/04/19   16:27         40             35             21          CNTOIMP

  MAXIMUMS:      01.14         84/04/04      84/04/19   16:27         40             41             30

  TOTALS:                                                            103            102             73

END OF MEMBER LIST
```

```
      PROJECT: CNTOIMP              MEMBER: BACKUP                     DATE: 84/04/19
      LIBRARY: NUTP                 LEVEL:  01.06                      TIME: 16:28
      TYPE:    CLIST                USERID: CNTOIMP                    PAGE: 01 OF 01
START                                                                                 MOD
 COL  ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8 FLAGS

  1   PROC 0                                                                00010003  *
  1   CONTROL NOFLUSH PROMPT MSG END(ENDC)                                  00011003  *
  1   /*                                                               */   00020000
  1   /*        THIS CLIST SUBMITS THE JCL TO BACKUP THE FOLLOWING     */   00030000
  1   /*        DATASETS ONTO TAPE.                                    */   00040000
  1   /*           1. CNTOIMP.NUTP.CLIST                               */   00053005  *
  1   /*           2. CNTOIMP.NUTP.JCL                                 */   00054005  *
  1   /*           3. CNTOIMP.MASTER.DATA                              */   00055005  *
  1   /*           4. CNTOIMP.FOCEXEC.DATA                             */   00056005  *
  1   /*                                                               */   00060000
  1   ATTN DO                                                               00070003  *
  3     WRITE ** CLIST ENDED DUE TO ATTENTION **                            00080003  *
  3     GOTO EXITLINE                                                       00090003  *
  1   ENDC                                                                  00100003  *
  1   WRITE                                                                 00120000
  1   WRITE                    CANUT BACKUP PROCEDURE                       00130002  *
  1   WRITE                    &SYSDATE       &SYSTIME                      00140002  *
  1   WRITE                                                                 00150004  *
  1   WRITE          THIS PROCEDURE WILL COPY THE FOLLOWING FILES ON TO A   00160003  *
  1   WRITE          TAPE AND DELETE THE DISK FILES UPON NORMAL COMPLETION. 00161003  *
  1   WRITE                                                                 00162003  *
  1   WRITE               CNTOIMP.NUTP.CLIST        CNTOIMP.NUTP.JCL        00180006  **
  1   WRITE               CNTOIMP.MASTER.DATA       CNTOIMP.FOCEXEC.DATA    00181006  **
  1   START: -                                                              00190000
  3     WRITE                                                               00200000
  3     WRITENR       ENTER 'Y' IF YOU WANT THESE FILES ON TAPE ==>         00230004  *
  3     READ CHECKI                                                         00240000
  3     WRITE                                                               00241004  *
  3     IF &CHECKI NE Y THEN GOTO EXITLINE                                  00250003  *
  1   RUNJCL: -                                                             00310000
  3     SUB 'CNTOIMP.NUTP.JCL(BACKUP)'                                      00320003  *
  1   EXITLINE: -                                                           00340000
  3     EXIT                                                                00350000
```

```
      PROJECT: CNTOIMP          MEMBER: FOCUS                     DATE: 84/04/19
      LIBRARY: NUTP             LEVEL:  01.05                     TIME: 16:28
      TYPE:    CLIST            USERID: CNTOIMP                   PAGE: 01 OF 01
START                                                                               MOD
 COL  ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8  FLAGS

  1   PROC 0                                                            00010001     *
  1   /*****************************************************************/ 00020003     *
  1   /*                          N U T P                              */ 00030005     **
  1   /*             FOCUS ALLOCATION AND CALL CLIST                   */ 00040004     *
  1   /*                                                               */ 00050004     *
  1   /*****************************************************************/ 00060004     *
  1   /*CCNTROL NGPRGMPT NGMSG                                            00070004     *
  1   FREE F(MASTER   FOCEXEC  ERRORS  USERLIB HOLD  HOLDMAST SAVE FOCSORT)   00080004     *
  1   FREE F(PROFILE FOCSTACK FOCSML OFL  CFFLINE)                      00090004     *
  1   ALLCC F(MASTER)   DA('CNTOIMP.MASTER.DATA') SHR                   00100005     **
  1   ALLCC F(PROFILE)  DA('CNTOIMP.PROFILE.CATANOSU') SFR              00110005     **
  1   ALLCC F(FOCEXEC)  DA('CNTOIMP.FOCEXEC.DATA') SHR                  00120005     **
  1   ALLOC F(ERRORS)   DA('CSC05.FCCUS.ERRGRS.DATA.PRGD')    SHR       00130004     *
  1   ALLOC F(USERLIB)  DA('CSC05.FOCUS.LOAD.PROD'                     +00140004     *
  7        'CSC05.FCCUS.FUSELIB.LOAD.PROD' 'PIP01.PIPP.LOAD') SHR       0C150004     *
  1   ALLGC F(HOLD)       UNIT(SYSDA) SP(20 20) TRACKS                  00160004     *
  1   ALLOC F(HOLDMAST) UNIT(SYSDA) SP(10 10) TRACKS DIR(10)            00170004     *
  1   ALLOC F(SAVE)       UNIT(SYSDA) SP(20 20) TRACKS                  00180004     *
  1   ALLCC F(FOCSORT)  UNIT(SYSDA) SP(30 30) TRACKS                    00190004     *
  1   ALLOC F(FOCSTACK) UNIT(SYSDA) SP(20 20) TRACKS                    00200004     *
  1   ALLCC F(FOCSML)   UNIT(SYSDA) SP(20 20) THACKS                    00210004     *
  1   DEL OFFLINE.DATA                                                  00220004     *
  1   ATTR  OFL RECFM(F B) LRECL(133) BLKSIZE(133) DSORG(PS)            00230004     *
  1   ALLCC F(OFFLINE) DA(OFFLINE.DATA) +                               00240004     *
  2    UNIT(SYSDA)  NEW SP(5.20) TRACKS USING(OFL)                      00241004     *
  1   CALL 'CSC05.FOCUS.LOAD.PRGD(FCCUS)'                               00250004     *
  1   FREE F(MASTER   FOCEXEC  ERRORS  USERLIB HOLD  HOLDMAST SAVE FOCSORT)   00260004     *
  1   FREE F(PROFILE FCCSTACK FCCSML OFFLINE OFL)                       00270004     *
  1   DEL OFFLINE.DATA                                                  00280004     *
  1   END                                                               00290004     *
```

```
      PROJECT: CNTOIMP               MEMBER: REPORT                    DATE: 84/04/19                              REPORT
      LIBRARY: NUTP                  LEVEL:  01.14                     TIME: 16:28
      TYPE:    CLIST                 USERID: CNTOIMP                   PAGE: 01 OF 01
START                                                                                    MOD
 COL  ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8  FLAGS

   1  PROC 0                                                                  00010013   *
   1  CONTROL NOFLUSH PROMPT MSG END(ENDO)                                    00011013   *
   1  /*                                                                  */  00020000
   1  /*        THIS CLIST SUBMITS THE JCL TO PRODUCE REPORTS OF THE      */  00030000
   1  /*        DATA COLLECTED. THE TAPE RECEIVED FROM DE SYSTEMS IS      */  00040000
   1  /*        UNLABELLED SO A VOLUME SERIAL MUST BE SPECIFIED.          */  00050000
   1  /*                                                                  */  00060000
   1  ATTN DO                                                                 00070013   *
   3    WRITE ** CLIST ENDED DUE TO ATTENTION **                              00080013   *
   3    GOTO EXITLINE                                                         00090013   *
   1  ENDO                                                                    00100013   *
   1  WRITE                                                                   00120000
   1  WRITE                CANUT DATA COLLECTION REPORT PROCEDURE             00130012   *
   1  WRITE                       &SYSDATE        &SYSTIME                    00140012   *
   1  WRITE                                                                   00150000
   1  WRITE             THIS PROCEDURE PRODUCES FORMATTED REPORTS OF          00160012   *
   1  WRITE             THE DATA COLLECTED FROM VARIOUS STUDIES FOR           00170014   **
   1  WRITE             THE CANMET NATIONAL URANIUM TAILINGS PROGRAM.         00180012   *
   1  START: -                                                                00190000
   3    WRITE                                                                 00200000
   3    WRITENR         PLEASE ENTER THE TAPE VOLSER FOR THE CANUT DATA ==>   00210014   **
   3    READ VOLSER                                                           00220000
   3    WRITENR         YOU HAVE ENTERED "&VOLSER". IS THIS CORRECT? (Y/N) ==> 00230012  *
   3    READ CHECK1                                                           00240000
   3    WRITE                                                                 00241011   *
   3    IF &CHECK1 NE Y AND &CHECK1 NE T THEN GOTO START                      00250007   *
   3    EDIT 'CNTOIMP.NUTP.JCL(REPORT)' CNTL                                  00250106   *
   3    RENUM                                                                 00252009   *
   3    C 1 99999 /BVCLSER/&VOLSER/ALL                                        00253009   *
   3    IF &CHECK1 EQ T THEN GOTO LISTJCL                                     00260000
   3    GOTO RUNJCL                                                           00270006   *
   1  LISTJCL: -                                                              00280000
   3    LIST                                                                  00290000
   3    END NOSAVE                                                            00301007   *
   3    GOTO EXITLINE                                                         00302007   *
   1  RUNJCL: -                                                               00310000
   3    SUB                                                                   00320000
   3    END NOSAVE                                                            00330000
   1  EXITLINE: -                                                             00340000
   3    EXIT                                                                  00350000
```

```
PROJECT: CNT01MP                                                                                               DATE: 84/04/19
LIBRARY: NUTP                                                                                                  TIME: 16:28
TYPE:    JCL                                                                                                   PAGE: 001

GENERAL DATA:                     GENERAL DATA:                         CURRENT ALLOCATION:           CURRENT UTILIZATION:
   VOLUME SERIAL:   RES002           RECORD FORMAT:          FB                 2 TRACKS                      2 TRACKS
   DEVICE TYPE:       3375           RECORD LENGTH:          80                 1 EXTENT                      1 EXTENT
   ORGANIZATION:        PC           BLOCK SIZE:          3.120                10 DIRECTORY BLOCKS            1 DIRECTORY BLOCK
   CREATION DATE: 84/04/16           1ST EXTENT SIZE:         2                                               2 MEMBERS
                                     SECONDARY QUAN:          5

 MEMBER        VERS.MOD       CREATION        DATE AND TIME        CURRENT      INITIAL      MODIFIED      USER
  NAME          LEVEL           DATE          LAST MODIFIED       NO. LINES    NO. LINES    NO. LINES       ID

 BACKUP         01.21         83/11/23       84/04/19  16:25         92          132           90        CNT01MP
 REPORT         01.23         84/04/02       84/04/19  16:25         42            8           35        CNT01MP

   MAXIMUMS:    01.23         84/04/02       84/04/19  16:25         92          132           90

   TOTALS:                                                          134          140          125

 END OF MEMBER LIST
```

```
      PROJECT: CNTOIMP                 MEMBER: BACKUP                       DATE: 84/04/19                BACKUP
      LIBRARY: NUTP                    LEVEL:  01.21                        TIME: 16:28
      TYPE:    JCL                     USERID: CNTOIMP                      PAGE: 01 OF 02
START                                                                                         MOD
 COL  ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8      FLAGS
  1   //CNTOIMPB JOB (CNTOIMP,258,9,9),'CNTOIMP',MSGCLASS=A,                  00001021     **
  1   //         NOTIFY=CNTOIMP                                               00020013     *
  1   //*********************************************************************  00040001     *
  1   //*        THIS JCL, 'CNTOIMP.NUTP.JCL(BACKUP)' IS SUBMITTED          *  00050018     *
  1   //*        FROM THE CLIST 'CNTOIMP.NUTP.CLIST(BACKUP)'.               *  00060018     *
  1   //*                                                                   *  00070001     *
  1   //*        ITS PURPOSE IS TO BACKUP TO TAPE THE FOLLOWING:            *  00080014     *
  1   //*                                                                   *  00090001     *
  1   //*            1. CNTOIMP.NUTP.CLIST                                  *  00212014     *
  1   //*            2. CNTOIMP.NUTP.JCL                                    *  00213014     *
  1   //*            3. CNTOIMP.MASTER.DATA                                 *  00215014     *
  1   //*            4. CNTOIMP.FOCEXEC.DATA                                *  00216014     *
  1   //*                                                                   *  00220001     *
  1   //*********************************************************************  00230001     *
  1   //*                                                                     00231019     *
  1   //****  COMPRESS THE DATASETS BEFORE BACKUP  ****                       00232019     *
  1   //*                                                                     00233019     *
  1   //STEP01 EXEC PGM=IEBCOPY                                               00234019     *
  1   //SYSPRINT DD SYSOUT=*                                                  00235019     *
  1   //FILE01   DD DSN=CNTOIMP.NUTP.CLIST,DISP=SHR                           00236019     *
  1   //SYSIN    DD *                                                         00237019     *
  3     COPY OUTDD=FILE01,INDD=FILE01                                         00238019     *
  1   /*                                                                      00239019     *
  1   //STEP02 EXEC PGM=IEBCOPY                                               00239119     *
  1   //SYSPRINT DD SYSOUT=*                                                  00239219     *
  1   //FILE02   DD DSN=CNTOIMP.NUTP.JCL,DISP=SHR                             00239319     *
  1   //SYSIN    DD *                                                         00239419     *
  3     COPY OUTDD=FILE02,INDD=FILE02                                         00239519     *
  1   /*                                                                      00239619     *
  1   //STEP03 EXEC PGM=IEBCOPY                                               00239719     *
  1   //SYSPRINT DD SYSOUT=*                                                  00239819     *
  1   //FILE03   DD DSN=CNTOIMP.MASTER.DATA,DISP=SHR                          00239919     *
  1   //SYSIN    DD *                                                         00240019     *
  3     COPY OUTDD=FILE03,INDD=FILE03                                         00240119     *
  1   /*                                                                      00240219     *
  1   //STEP04 EXEC PGM=IEBCOPY                                               00240319     *
  1   //SYSPRINT DD SYSOUT=*                                                  00240419     *
  1   //FILE04   DD DSN=CNTOIMP.FOCEXEC.DATA,DISP=SHR                         00240519     *
  1   //SYSIN    DD *                                                         00240619     *
  3     COPY OUTDD=FILE04,INDD=FILE04                                         00240719     *
  1   /*                                                                      00240819     *
  1   //*                                                                     00241001     *
  1   //****   B A C K U P   C L I S T   ****                                 00250017     *
  1   //*                                                                     00260016     *
  1   //STEP05 EXEC PGM=IEBCOPY                                               00340019     *
  1   //SYSPRINT DD SYSOUT=*                                                  00350001     *
  1   //DDSOURCE DD DSN=CNTOIMP.NUTP.CLIST,DISP=SHR                           00360013     *
  1   //DDBACKUP DD DSN=CNTOIMP.NUTP.CLIST.BACKUP,DISP=OLD,                   00370018     *
  1   //             LABEL=1,UNIT=TAPE,VOL=(,RETAIN,SER=ER3933)               00380020     *
  1   //SYSIN    DD *                                                         00390001     *
  3     COPY OUTDD=DDBACKUP,INDD=((DDSOURCE,R))                               00400018     *
  1   //*                                                                     00420001     *
  1   //****   B A C K U P   J C L   ****                                     00421017     *
  1   //*                                                                     00422016     *
```

```
      PROJECT: CNTOIMP                  MEMBER: BACKUP                    DATE: 84/04/19
      LIBRARY: NUTP                     LEVEL:  01.21                     TIME: 16:20
      TYPE:    JCL                      USERID: CNTOIMP                   PAGE: 02 OF 02
START                                                                                      MOD
 COL  ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8   FLAGS

  1   //STEP06 EXEC PGM=IEBCOPY                                                00430019    *
  1   //SYSPRINT DD SYSCUT=*                                                   00440001    *
  1   //DDSOURCE DD DSN=CNTOIMP.NLTF.JCL.DISP=SHR                              00450013    *
  1   //DDBACKUP DD DSN=CNTOIMP.NUTP.JCL.BACKUP.DISP=OLD.                      00460018    *
  1   //            LABEL=2.UNIT=TAPE.VOL=(.RETAIN.SER=ER3933)                 00470020    *
  1   //SYSIN    DD *                                                          00480001    *
  3     CCPY OUTDD=DDBACKUP.INDD=((DDSOURCE.R))                                00490018    *
  1   //*                                                                      00510000
  1   //****  B A C K U P   M A S T E R  ****                                  00511017    *
  1   //*                                                                      00512017    *
  1   //STEP07 EXEC PGM=IEBCOPY                                                00520019    *
  1   //SYSPRINT DD SYSOUT=*                                                   00530001    *
  1   //DDSOURCE DD DSN=CNTOIMP.MASTER.DATA.DISP=SHR                           00540013    *
  1   //DDBACKUP DD DSN=CNTOIMP.MASTER.DATA.BACKUP.DISP=OLD.                   00550018    *
  1   //            LABEL=3.UNIT=TAPE.VOL=(.RETAIN.SER=ER3933)                 00560020    *
  1   //SYSIN    DD *                                                          00570001    *
  3     CCPY OUTDD=DDBACKUP.INDD=((DDSOURCE.R))                                00571018    *
  1   //*                                                                      01050001    *
  1   //****  B A C K U P   F O C E X E C  ****                                01051017    *
  1   //*                                                                      01052017    *
  1   //STEP08 EXEC PGM=IEBCOPY                                                01060019    *
  1   //SYSPRINT DD SYSOUT=*                                                   01070001    *
  1   //DDSOURCE DD DSN=CNTOIMP.FOCEXEC.DATA.DISP=SHR                          01080013    *
  1   //DDBACKUP DD DSN=CNTOIMP.FCCEXEC.DATA.BACKUP.DISP=OLD.                  01090018    *
  1   //            LABEL=4.UNIT=TAPE.VCL=SER=ER3933                           01100018    *
  1   //SYSIN    DD *                                                          01110000
  2    COPY OUTDD=DDBACKUP.INDD=((DDSOURCE.R))                                 01111017    *
  1   //*                                                                      01140013    *
  1   //****  D E L E T E   F I L E S  ****                                    01141017    *
  1   //*                                                                      01142017    *
  1   //STEP09 EXEC PGM=IEFBR14.CCND=(0.NE)                                    01150019    *
  1   //SYSPRINT DD SYSOUT=*                                                   01160013    *
  1   //SYSCUT    DD SYSOUT=*                                                  01161013    *
  1   //DD1       DD DSN=CNTOIMP.FOCEXEC.DATA.DISP=(OLD.DELETE)                01170013    *
  1   //DD2       DD DSN=CNTOIMP.MASTER.DATA.DISP=(OLD.DELETE)                 01180013    *
  1   //DD3       DD DSN=CNTOIMP.NUTP.CLIST.DISP=(OLD.DELETE)                  01190013    *
  1   //DD4       DD DSN=CNTOIMP.NUTP.JCL.DISP=(CLD.DELETE)                    01200013    *
  1   /*                                                                       01320001    *
```

```
                                                                                                                  REPORT
      PROJECT: CNTOIMP                  MEMBER: REPORT                    DATE: 84/04/19
      LIBRARY: NUTP                     LEVEL:  01.23                     TIME: 16:28
      TYPE:    JCL                      USERID: CNTOIMP                   PAGE: 01 OF 01
START                                                                                         MOD
 COL  ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8   FLAGS

  1   //CNTOIMPA JOB (CNTOIMP,9,100,100),'CNTOIMP',MSGCLASS=A,              00010023    **
  1   //         NOTIFY=CNTOIMP                                             00020000
  1   //**********************************************************         00030000
  1   //*        THIS JCL WILL PRODUCE FORMATTED REPORTS OF THE         *    00040000
  1   //*        DATA COLLECTED FOR THE CANMET NATIONAL URANIUM         *    00050000
  1   //*        TAILINGS PROGRAM.                                      *    00060000
  1   //**********************************************************         00070000
  1   //*                                                                  00080000
  1   //STEP1     EXEC PGM=IEBGENER                                        00090004    *
  1   //SYSPRINT  DD SYSOUT=*                                              00100004    *
  1   //SYSOUT    DD SYSOUT=*                                              00110004    *
  1   //SYSIN     DD DUMMY                                                 00120004    *
  1   //SYSUT1    DD DSN=CNTOIMP.CANUT.DATA,DISP=(OLD,KEEP),UNIT=TAPE,     00130004    *
  1   //             VOL=SER=BVCLSER,LABEL=(,NL),                          00140004    *
  1   //             DCB=(RECFM=FB,LRECL=364,BLKSIZE=3640,DSORG=PS)        00150004    *
  1   //SYSUT2    DD DSN=&&NUTDATA,UNIT=SYSDA,DISP=(,PASS,DELETE),         00160020    *
  1   //             SPACE=(TRK,(10,30),RLSE),                             00170007    *
  1   //             DCB=(RECFM=FB,LRECL=364,BLKSIZE=18928,DSORG=PS)       00180014    *
  1   //*                                                                  00190004    *
  1   //STEP2     EXEC PGM=FOCUS,REGION=1024K,TIME=30,COND=(0,NE)          00200004    *
  1   //STEPLIB   DD DSN=CSC05.FOCUS.LOAD.PROD,DISP=SHR                    00210001    *
  1   //MASTER    DD DSN=CNTOIMP.MASTER.DATA,DISP=SHR                      00220001    *
  1   //FOCEXEC   DD DSN=CNTOIMP.FOCEXEC.DATA,DISP=SHR                     00230001    *
  1   //ERRORS    DD DSN=CSC05.FOCUS.ERRORS.DATA.PROD,DISP=SHR             00240001    *
  1   //USERLIB   DD DSN=CSC05.FOCUS.LOAD.PROD,DISP=SHR                    00250001    *
  1   //          DD DSN=CSC05.FOCUS.FUSELIB.LOAD.PROD,DISP=SHR            00260001    *
  1   //FOCSORT   DD UNIT=SYSDA,SPACE=(CYL,(5,1))                          00261019    *
  1   //HOLDMAST  DD UNIT=SYSDA,SPACE=(CYL,(5,1,1))                        00261119    *
  1   //AFILE     DD DSN=&&AFILE,UNIT=SYSDA,SPACE=(CYL,(5,1))              00262018    *
  1   //BFILE     DD DSN=&&BFILE,UNIT=SYSDA,SPACE=(CYL,(5,1))              00263018    *
  1   //CFILE     DD DSN=&&CFILE,UNIT=SYSDA,SPACE=(CYL,(5,1))              00264018    *
  1   //CANUT     DD DSN=&&NUTDATA,DISP=(OLD,DELETE)                       00270020    *
  1   //OFFLINE   DD SYSOUT=A                                              00280023    **
  1   //SYSOUT    DD SYSOUT=*                                              00290011    *
  1   //SYSPRINT  DD SYSOUT=*                                              00300001    *
  1   //SYSIN     DD *                                                     00310001    *
  4     OFFLINE                                                            00320001    *
  4     SET NODATA = ' '                                                   00330003    *
  4     EX REPORT                                                          00340023    **
  4     OFFLINE CLOSE                                                      00350001    *
  4     FIN                                                                00360001    *
  1   //                                                                   00370001    *
```

```
       DATASET:  CNT01MP.MASTER.DATA                                          DATE:  04/07/25
       MEMBER:   CAMUT                       LEVEL:  01.05                    TIME:  17:41
                                             USERID: CNT01MP                  PAGE:  01 OF 02
START                                                                                              MOD
 COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8   FLAGS

   1   FILE=CAMUT,SUFFIX=FIX,$                                                  00010000
   2    SEGNAME=STUDY                                                           00020000
   5        FIELD=RECTYPE,1,A1,A1,$                                             00030000
   5        FIELD=STUDY_ID,,A4,A4,$                                             00040000
   5        FIELD=PUBLISH_YEAR,,A4,A4,$                                         00050000
   5        FIELD=MAIN_SPONSOR,,A25,A25,$                                       00060000
   5        FIELD=STUDY_DESC,,A35,A35,$                                         00070000
   5        FIELD=STUDY_TITLE1,,A80,A80,$                                       00080000
   5        FIELD=STUDY_TITLE2,,A80,A80,$                                       00090000
   5        FIELD=STUDY_TITLE3,,A80,A80,$                                       00100000
   2    SEGNAME=SAMPLE,PARENT=STUDY                                             00110000
   5        FIELD=RECTYPE,2,A1,A1,$                                             00120000
   5        FIELD=TAILING_SITE,,A12,A12,$                                       00130000
   5        FIELD=STUDY_ID2,,A4,A4,$                                            00140000
   5        FIELD=SAMPLE_ID,,A7,A7,$                                            00150000
   5        FIELD=REFERENCE_ID,,A12,A12,$                                       00160000
   5        FIELD=YEAR_FROM,,A2,A2,$                                            00170000
   5        FIELD=MONTH_FROM,,A2,A2,$                                           00180000
   5        FIELD=DAY_FROM,,A2,A2,$                                             00190000
   5        FIELD=HOUR_FROM,,A2,A2,$                                            00200000
   5        FIELD=MIN_FROM,,A2,A2,$                                             00210000
   5        FIELD=SEC_FROM,,A2,A2,$                                             00220000
   5        FIELD=YEAR_TO,,A2,A2,$                                              00230000
   5        FIELD=MONTH_TO,,A2,A2,$                                             00240000
   5        FIELD=DAY_TO,,A2,A2,$                                               00250000
   5        FIELD=HOUR_TO,,A2,A2,$                                              00260000
   5        FIELD=MIN_TO,,A2,A2,$                                               00270000
   5        FIELD=SEC_TO,,A2,A2,$                                               00280000
   5        FIELD=DUR_YY,,A2,A2,$                                               00290000
   5        FIELD=DUR_MM,,A2,A2,$                                               00300000
   5        FIELD=DUR_DD,,A2,A2,$                                               00310000
   5        FIELD=DUR_HH,,A2,A2,$                                               00320000
   5        FIELD=DUR_MN,,A2,A2,$                                               00330000
   5        FIELD=DUR_SS,,A2,A2,$                                               00340000
   5        FIELD=QUALIFIER,,A6,A6,$                                            00350000
   5        FIELD=EASTING1,,A6,A6,$                                             00360000
   5        FIELD=EASTING2,,A1,A1,$                                             00370000
   5        FIELD=NORTHING1,,A7,A7,$                                            00380000
   5        FIELD=NORTHING2,,A1,A1,$                                            00390000
   5        FIELD=ZONE,,A2,A2,$                                                 00400000
   5        FIELD=LATITUDE1,,A2,A2,$                                            00410000
   5        FIELD=LATITUDE2,,A5,A5,$                                            00420000
   5        FIELD=LONGITUDE1,,A3,A3,$                                           00430000
   5        FIELD=LONGITUDE2,,A5,A5,$                                           00440000
   5        FIELD=SAMPLE_ELEV1,,A4,A4,$                                         00450000
   5        FIELD=SAMPLE_ELEV2,,A2,A2,$                                         00460000
   5        FIELD=SAMPLE_DPTH1,,A4,A4,$                                         00470000
   5        FIELD=SAMPLE_DPTH2,,A2,A2,$                                         00480000
   5        FIELD=ED_UNITS,,A4,A4,$                                             00490000
   5        FIELD=N1_TREATMNT,,A1,A1,$                                          00500000
   5        FIELD=N2_TREATMNT,,A1,A1,$                                          00510000
   5        FIELD=N3_TREATMNT,,A1,A1,$                                          00520000
   5        FIELD=SAMPLE_DESC,,A35,A35,$                                        00530000
   5        FIELD=LOCATION1,,A100,A100,$                                        00540000
```

```
        DATASET: CNT01MP.MASTER.DATA                                             DATE: 84/07/25
        MEMBER:  CANUT                         LEVEL:  01.05                     TIME: 17:41
                                               USERID: CNT01MP                   PAGE: 02 OF 03
 START                                                                                               MOD
  COL   ----+----1----+----2----+----3----+----4----+----5----+----6----+---- 7----+----8  FLAGS

    5        FIELD=LOCATION2,,A100,A100,$                                          00550000
    2     SEGNAME=MEASURE,PARENT=SAMPLE                                            00560000
    5        FIELD=RECTYPE,3,A1,A1,$                                               00570000
    5        FIELD=STUDY_ID3,,A4,A4,$                                              00580000
    5        FIELD=SAMPLE_ID3,,A7,A7,$                                             00590000
    5        FIELD=PARAMETER,,A20,A20,$                                            00600000
    5        FIELD=MEASURE_TYPE,,A7,A7,$                                           00610000
    5        FIELD=DETECT_LIMIT,,A1,A1,$                                           00620000
    5        FIELD=SIGNA,,A1,A1,$                                                  00630003      *
    5        FIELD=VALUE1,,A6,A6,$                                                 00640000
    5        FIELD=VALUE2,,A5,A5,$                                                 00650000
    5        FIELD=VALUE_EXP,,A3,A3,$                                              00660000
    5        FIELD=CONFIDENCE1,,A6,A6,$                                            00670000
    5        FIELD=CONFIDENCE2,,A5,A5,$                                            00680000
    5        FIELD=CONFID_EXP,,A3,A3,$                                             00690000
    5        FIELD=UNITS,,A10,A10,$                                                00700000
    2     SEGNAME=B_SAMPLE,PARENT=STUDY                                            00710000
    5        FIELD=RECTYPE,4,A1,A1,$                                               00720000
    5        FIELD=B_TAILINGS,,A12,A12,$                                           00730000
    5        FIELD=STUDY_ID4,,A4,A4,$                                              00740000
    5        FIELD=SAMPLE_ID4,,A7,A7,$                                             00750000
    5        FIELD=B_REFERENCE,,A12,A12,$                                          00760000
    5        FIELD=B_SAMP_YEAR,,A2,A2,$                                            00770000
    5        FIELD=B_SAMP_MNTH,,A2,A2,$                                            00780000
    5        FIELD=B_SAMP_DAY,,A2,A2,$                                             00790000
    5        FIELD=B_SAMP_DESC,,A35,A35,$                                          00800000
    5        FIELD=B_COLLAR1,,A4,A4,$                                              00810000
    5        FIELD=B_COLLAR2,,A2,A2,$                                              00820000
    5        FIELD=B_INCLINE,,A3,A3,$                                              00830000
    5        FIELD=B_AZIMUTH,,A3,A3,$                                              00840000
    5        FIELD=B_LENGTH1,,A5,A5,$                                              00850005     **
    5        FIELD=B_LENGTH2,,A2,A2,$                                              00860000
    5        FIELD=B_CL_UNITS,,A10,A10,$                                           00870000
    5        FIELD=MINE_GRIDN1,,A6,A6,$                                            00880000
    5        FIELD=MINE_GRIDN2,,A2,A2,$                                            00890000
    5        FIELD=MINE_GRIDE1,,A6,A6,$                                            00900005     **
    5        FIELD=MINE_GRIDE2,,A1,A1,$                                            00910005     **
    5        FIELD=B_LOCATION1,,A100,A100,$                                        00920000
    5        FIELD=B_LOCATION2,,A100,A100,$                                        00930000
    2     SEGNAME=B_OBSERV,PARENT=B_SAMPLE                                         00940000
    5        FIELD=RECTYPE,5,A1,A1,$                                               00950000
    5        FIELD=STUDY_ID5,,A4,A4,$                                              00960000
    5        FIELD=SAMPLE_ID5,,A7,A7,$                                             00970000
    5        FIELD=BO_DI_UNITS,,A2,A2,$                                            00980000
    5        FIELD=BO_DPTH_FR1,,A5,A5,$                                            00990000
    5        FIELD=BO_DPTH_FR2,,A2,A2,$                                            01000000
    5        FIELD=BO_DPTH_TO1,,A5,A5,$                                            01010000
    5        FIELD=BO_DPTH_TO2,,A2,A2,$                                            01020000
    5        FIELD=BO_MTYPT,,A7,A7,$                                               01030000
    5        FIELD=B_OBSERVATN,,A20,A20,$                                          01040000
    2     SEGNAME=BMEASURE,PARENT=B_SAMPLE                                         01050002      *
    5        FIELD=RECTYPE,6,A1,A1,$                                               01060000
    5        FIELD=STUDY_ID6,,A4,A4,$                                              01070000
    5        FIELD=SAMPLE_ID6,,A7,A7,$                                             01080000
```

```
       DATASET: CNT01MF.MASTER.DATA                               DATE: 84/07/25
       MEMBER:  CANUT                 LEVEL:   01.05              TIME: 17:41
                                      USERID:  CNT01MF            PAGE: 03 OF 03
START                                                                                MOD
COL    ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8  FLAGS

  5        FIELD=BM_DI_UNITS,,A2,A2,$                                         01090000
  5        FIELD=BM_DPTH_FR1,,A5,A5,$                                         01100000
  5        FIELD=BM_DPTH_FR2,,A2,A2,$                                         01110000
  5        FIELD=BM_DPTH_TO1,,A5,A5,$                                         01120000
  5        FIELD=BM_DPTH_TO2,,A2,A2,$                                         01130000
  5        FIELD=BM_PARAMETER,,A20,A20,$                                      01140000
  5        FIELD=BM_MTYPE,,A7,A7,$                                            01150000
  5        FIELD=BM_VALUE1,,A7,A7,$                                           01160004   *
  5        FIELD=BM_VALUE2,,A5,A5,$                                           01170000
  5        FIELD=BM_UNITS,,A10,A10,$                                          01180000
```

```
PROJECT: CNTOIMP                                                                                              DATE: 84/04/19
LIBRARY: FOCEXEC                                                                                              TIME: 16:28
TYPE:    DATA                                                                                                 PAGE: 001

GENERAL DATA:                       GENERAL DATA:                      CURRENT ALLOCATION:            CURRENT UTILIZATION:
   VOLUME SERIAL:   RESD02             RECORD FORMAT:        FB             32 TRACKS                        6 TRACKS
   DEVICE TYPE:       3375             RECORD LENGTH:        80              7 EXTENTS                       2 EXTENTS
   ORGANIZATION:        PO             BLOCK SIZE:        3,120             10 DIRECTORY BLOCKS              1 DIRECTORY BLOCK
   CREATION DATE: 84/04/16             1ST EXTENT SIZE:       2                                              1 MEMBER
                                       SECONDARY QUAN:        5

 MEMBER        VERS.MOD        CREATION       DATE AND TIME        CURRENT        INITIAL        MODIFIED        USER
  NAME          LEVEL            DATE         LAST MODIFIED       NO. LINES      NO. LINES      NO. LINES         ID

REPORT          01.30          84/04/18       84/04/19  16:18        171            406            171         CNTOIMP

  MAXIMUMS:     01.30          84/04/18       84/04/19  16:18        171            406            171

  TOTALS:                                                            171            406            171

 END OF MEMBER LIST
```

```
      DATASET: CNT01MP.FOCEXEC.DATA                                        DATE: 84/07/25
      MEMBER:  REPORT                   LEVEL:  01.40                      TIME: 17:41
                                        USERID: CNT01MP                    PAGE: 01 OF 04
START                                                                                       MOD
 COL  ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8   FLAGS

   1  DEFINE FILE CANUT                                                      00010011    *
   1  L01/A75 = 'PUBLICATION YEAR : '|PUBLISH_YEAR|                          00020025    *
  11            '               MAIN SPONSOR : '|MAIN_SPONSOR;              00030022    *
   1  L02/A60 = 'STUDY DESCRIPTION: '|STUDY_DESC;                            00040022    *
   1  L03/A109 = 'STUDY TITLE .....: '|STUDY_TITLE1;                         00050022    *
   1  L04/A109 = '                   '|STUDY_TITLE2;                         00060022    *
   1  L05/A109 = '                   '|STUDY_TITLE3;                         00070022    *
   1  TIME_FROM/A8 = IF HOUR_FROM EQ ' ' THEN ' '                            00080011    *
  16                 ELSE IF MIN_FROM EQ ' ' THEN HOUR_FROM|':00'            00090011    *
  16                 ELSE IF SEC_FROM EQ ' ' THEN HOUR_FROM|':'|MIN_FROM     00100011    *
  16                 ELSE HOUR_FROM|':'|MIN_FROM|':'|SEC_FROM;               00110011    *
   1  DATE_TO/A14 = IF YEAR_TO EQ ' ' THEN ' '                               00120011    *
  15                ELSE '  TO  '|YEAR_TO|'/'|MONTH_TO|'/'|DAY_TO;           00130011    *
   1  XTIME_TO/A8 = IF HOUR_TO EQ ' ' THEN ' '                               00140011    *
  15                ELSE IF MIN_TO EQ ' ' THEN HOUR_TO|':00'                 00150011    *
  15                ELSE IF SEC_TO EQ ' ' THEN HOUR_TO|':'|MIN_TO            00160011    *
  15                ELSE HOUR_TO|':'|MIN_TO|':'|SEC_TO;                      00170011    *
   1  YEAR_DUR/A8 = IF DUR_YY EQ ' ' THEN ' ' ELSE DUR_YY|' YEARS';          00180011    *
   1  MONTH_DUR/A9 = IF DUR_MM EQ ' ' THEN ' ' ELSE DUR_MM|' MONTHS';        00190011    *
   1  DAY_DUR/A7 = IF DUR_DD EQ ' ' THEN ' ' ELSE DUR_DD|' DAYS';            00200011    *
   1  HOUR_DUR/A8 = IF DUR_YY EQ ' ' THEN ' ' ELSE DUR_YY|' HOURS';          00210011    *
   1  MIN_DUR/A7 = IF DUR_DD EQ ' ' THEN ' ' ELSE DUR_DD|' MINS';            00220011    *
   1  SEC_DUR/A7 = IF DUR_YY EQ ' ' THEN ' ' ELSE DUR_YY|' SECS';            00230011    *
   1  TOT_DUR/A51 = YEAR_DUR||(' '|MONTH_DUR)||(' '|DAY_DUR)||               00240011    *
  15                (' '|HOUR_DUR)||(' '|MIN_DUR)||(' '|SEC_DUR);            00250011    *
   1  DURATION/A61 = 'DURATION: '|TOT_DUR;                                   00260037    *
   1  LOC_QUAL/A29 = 'LOCATION ACCURACY: +/- '|QUALIFIER;                    00270020    *
   1  LOC_COORD/A80 = IF EASTING1 NE ' ' THEN                                00280011    *
  20                     '        EASTING: '|EASTING1||'.'|EASTING2|         00290011    *
  20                     '       NORTHING: '|NORTHING1||'.'|NORTHING2|       00300011    *
  20                     '       ZONE: '|ZONE                                00310011    *
  17                  ELSE IF LATITUDE1 NE ' ' THEN                          00320011    *
  20                     '        LATITUDE: '|LATITUDE1||'.'|LATITUDE2|      00330011    *
  20                     '       LONGITUDE: '|LONGITUDE1||'.'|LONGITUDE2     00340011    *
  17                  ELSE 'NO COORDINATES AVAILABLE';                       00350011    *
   1  PT_ELEV/A27 = 'POINT ELEVATION: '|SAMPLE_ELEV1||'.'|SAMPLE_ELEV2;      00360037    *
   1  SMP_DEPTH/A21 = 'SAMPLE DEPTH: '|SAMPLE_DPTH1||'.'|SAMPLE_DPTH2;       00370026    *
   1  SED_UNITS/A11 = 'UNITS: '|ED_UNITS;                                    00380026    *
   1  ALTER1/A11 = DECODE N1_TREATMNT (A 'ASHED' B 'ASH FREE'                00390011    *
  12             C 'FROZEN' D 'DRIED' E 'FILTERED' F 'ACIDIFIED'             00400011    *
  12             G 'EXTRACTED' H 'PRESERVED' I 'NOT TREATED');               00410011    *
   1  ALTER2/A11 = DECODE N2_TREATMNT (A 'ASHED' B 'ASH FREE'                00420011    *
  12             C 'FROZEN' D 'DRIED' E 'FILTERED' F 'ACIDIFIED'             00430011    *
  12             G 'EXTRACTED' H 'PRESERVED' I 'NOT TREATED');               00440011    *
   1  ALTER3/A11 = DECODE N3_TREATMNT (A 'ASHED' B 'ASH FREE'                00450011    *
  12             C 'FROZEN' D 'DRIED' E 'FILTERED' F 'ACIDIFIED'             00460011    *
  12             G 'EXTRACTED' H 'PRESERVED' I 'NOT TREATED');               00470011    *
   1  ALL_TREAT/A35 = ALTER1||(' '|ALTER2)||(' '|ALTER3);                    00480011    *
   1  TREATMENT/A50 = IF TREATMENT EQ ' ' THEN ' '                           00490011    *
  17                  ELSE '    TREATMENT: '|ALL_TREAT;                      00500011    *
   1  L06/A110 = 'TAILINGS SITE.....: '|TAILING_SITE|                        00510022    *
  12             '                    REFERENCE IDENTIFIER: '|REFERENCE_ID;  00520026    *
   1  L07/A129 = 'SAMPLE DATE/TIME..: '|(YEAR_FROM|'/'|MONTH_FROM|'/'|       00530037    *
  12             DAY_FROM|' '|TIME_FROM)||(DATE_TO|' '|XTIME_TO)             00540026    *
```

```
      DATASET: CNT01MP.FOCEXEC.DATA                                           DATE: 84/07/25
      MEMBER:  REPORT                  LEVEL:  01.40                          TIME: 17:41
                                       USERID: CNT01MP                        PAGE: 02 OF 04
START                                                                                         MOD
 COL  ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8  FLAGS

 12              ||('     '|DURATION);                                         00550037    *
  1   L08/A110 = 'SAMPLE DESCRIPTION: '|SAMPLE_DESC;                           00560022    *
  1   L09/A120 = 'LOCATION..........: '|LOCATION1;                             00570036    *
  1   L10/A120 = '                    '|LOCATION2;                             00580036    *
  1   L11/A110 = LOC_QUAL|LOC_COORD;                                           00590022    *
  1   L12/A122 = PT_ELEV|'       '|SMP_DEPTH|'       '|SED_UNITS|TREATMENT;    00600033    *
  1   VAL_EXP/A8 = IF VALUE_EXP EQ ' ' THEN '       '                          00610028    *
 14                ELSE ' E '|VALUE_EXP;                                       00620011    *
  1   CNF_EXP/A8 = IF CONFID_EXP EQ ' ' THEN '       '                         00630020    *
 14                ELSE ' E '|CONFID_EXP;                                      00640011    *
  1   L13/A100 = '            '|PARAMETER|' '|MEASURE_TYPE|'    '|             00650037    *
 12              DETECT_LIMIT|' '|SIGNA|VALUE1|'.'|VALUE2|VAL_EXP|'    '|      00660038    *
 12              CONFIDENCE1|'.'|CONFIDENCE2|CNF_EXP|' '|UNITS;                00670030    *
  1   COLLAR/A21 = 'COLLAR DEPTH: '|B_COLLAR1|'.'|B_COLLAR2;                   00680013    *
  1   INCLINE/A16 = 'INCLINATION: '|B_INCLINE;                                 00690013    *
  1   AZIMUTH/A12 = 'AZIMUTH: '|B_AZIMUTH;                                     00700013    *
  1   LENGTH/A27 = 'ALONG HOLE LENGTH: '|B_LENGTH1|'.'|B_LENGTH2;              00710040    **
  1   CL_UNITS/A17 = IF B_CL_UNITS EQ ' ' THEN ' '                             00720011    *
 16                 ELSE 'UNITS: '|B_CL_UNITS;                                 00730011    *
  1   L14/A110 = 'TAILINGS SITE: '|B_TAILINGS|                                 00740022    *
 12              '           REFERENCE IDENTIFIER: '|B_REFERENCE;              00750026    *
  1   L15/A110 = 'SAMPLE DATE: '|B_SAMP_YEAR|'/'|B_SAMP_MNTH|'/'|              00760022    *
 12              B_SAMP_DAY|'              SAMPLE DESCRIPTION: '|B_SAMP_DESC;  00770011    *
  1   L16/A110 = COLLAR|'     '|INCLINE|'     '|AZIMUTH|                       00780022    *
 12              '     '|LENGTH|'     '|CL_UNITS;                              00790020    *
  1   L17/A110 = IF MINE_GRIDN1 EQ ' ' THEN 'NO MINE GRID COORDINATES'         00800022    *
 12              ELSE 'MINE GRID COORDINATES: '|MINE_GRIDN1|'.'|               00810013    *
 12              MINE_GRIDN2|' N    '|MINE_GRIDE1|'.'|MINE_GRIDE2|' E';        00820011    *
  1   L18/A110 = 'LOCATION: '|B_LOCATION1;                                     00830022    *
  1   L19/A110 = '          '|B_LOCATION2;                                     00840022    *
  1   L20/A120 = '        '|BO_DPTH_FR1|'.'|BO_DPTH_FR2|                       00850031    *
 12              ' TO '|BO_DPTH_TO1|'.'|BO_DPTH_TO2|'  '|BO_DI_UNITS|          00860011    *
 12              '     '|B_OBSERVATN;                                          00870029    *
  1   L21/A120 = '        '|BM_DPTH_FR1|'.'|BM_DPTH_FR2|' TO '|BM_DPTH_TO1|    00880031    *
 12              '.'|BM_DPTH_TO2|'  '|BM_DI_UNITS|'      '|BM_PARAMETER|'    '| 00890022    *
 12              BM_MTYPE|'    '|BM_VALUE1|'.'|BM_VALUE2|'    '|BM_UNITS;      00900011    *
  1   SUBHDG1/A40 = 'DATA FOR SAMPLE '|SAMPLE_ID;                              00910017    *
  1   SUBHDG2/A120 = 'PARAMETER              '                                00920030    *
 16                 |'TYPE         VALUE              '|                       00930026    *
 16                 'CONFIDENCE              UNITS';                           00940030    *
  1   SUBHDG3/A40 = 'BOREHOLE DATA FOR SAMPLE '|SAMPLE_ID4;                    00950017    *
  1   SUBHDG4/A120 = '              '|                                         00960026    *
 16                 '           OBSERVATION/';                                 00970022    *
  1   SUBHDG5/A120 = ' DEPTH INTERVAL'|                                        00980026    *
 16                 '             PARAMETER              TYPE'|                00990026    *
 16                 '          VALUE        UNITS';                            01000026    *
  1   END                                                                      01010011    *
  1   TABLE FILE CANUT                                                         01020011    *
  1   HEADING                                                                  01030021    *
  1   "<34 DATA COLLECTED FOR CANMET NATIONAL URANIUM TAILINGS PROGRAM"        01040020    *
  1   "<55 STUDY NUMBER <STUDY_ID"                                             01050020    *
  1   "<52 <SUBHDG1"                                                           01060020    *
  1   " "                                                                      01070011    *
  1   " "                                                                      01080011    *
```

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         DATASET: CNT01MP.FOCEXEC.DATA                                      DATE: 84/07/25
         MEMBER:  REPORT                     LEVEL:  01.40                  TIME: 17:41
                                             USERID: CNT01MP                PAGE: 03 OF 04
START                                                                                            MOD
 COL    ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8    FLAGS

  1     "<10 <L01"                                                          01090031      *
  1     " "                                                                 01100011      *
  1     "<10 <L02"                                                          01110031      *
  1     " "                                                                 01120011      *
  1     "<10 <L03"                                                          01130031      *
  1     " "                                                                 01140011      *
  1     "<10 <L04"                                                          01150031      *
  1     " "                                                                 01160011      *
  1     "<10 <L05"                                                          01170031      *
  1     " "                                                                 01180011      *
  1     "<10 <L06"                                                          01190031      *
  1     " "                                                                 01200011      *
  1     "<10 <L07"                                                          01210031      *
  1     " "                                                                 01220011      *
  1     "<10 <L08"                                                          01230031      *
  1     "<10 <L09"                                                          01240031      *
  1     "<10 <L10"                                                          01250031      *
  1     " "                                                                 01260011      *
  1     "<10 <L11"                                                          01270031      *
  1     "<10 <L12"                                                          01280031      *
  1     " "                                                                 01290011      *
  1     "<10 <SUBHDG2"                                                      01300031      *
  1     " "                                                                 01310020      *
  1     PRINT L13 AS '' IN 1                                                01320022      *
  1     BY STUDY_ID SUP-PRINT                                               01330013      *
  1     BY SAMPLE_ID SUP-PRINT AND PAGE-BREAK                               01340011      *
  1     BY RECTYPE SUP-PRINT                                                01350012      *
  1     END                                                                 01360011      *
  1     TABLE FILE CANUT                                                    01370013      *
  1     HEADING                                                             01380021      *
  1     "<34 DATA COLLECTED FOR CANMET NATIONAL URANIUM TAILINGS PROGRAM"   01390020      *
  1     "<55 STUDY NUMBER <STUDY_ID"                                        01400020      *
  1     "<48 <SUBHDG3"                                                      01410020      *
  1     " "                                                                 01420013      *
  1     " "                                                                 01430013      *
  1     "<10 <L01"                                                          01440031      *
  1     " "                                                                 01450013      *
  1     "<10 <L02"                                                          01460031      *
  1     " "                                                                 01470013      *
  1     "<10 <L03"                                                          01480031      *
  1     " "                                                                 01490013      *
  1     "<10 <L04"                                                          01500031      *
  1     " "                                                                 01510013      *
  1     "<10 <L05"                                                          01520031      *
  1     " "                                                                 01530013      *
  1     "<10 <L14"                                                          01540031      *
  1     " "                                                                 01550013      *
  1     "<10 <L15"                                                          01560031      *
  1     " "                                                                 01570013      *
  1     "<10 <L16"                                                          01580031      *
  1     "<10 <L17"                                                          01590031      *
  1     " "                                                                 01600013      *
  1     "<10 <L18"                                                          01610031      *
  1     "<10 <L19"                                                          01620031      *
```

```
      DATASET: CNT01MP.FOCEXEC.DATA                                          DATE: 84/07/25
      MEMBER:  REPORT                   LEVEL:  01.10                        TIME: 17:11
                                        USERID: CNT01MP                      PAGE: 04 OF 04
START                                                                                      MOD
 COL  ----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8 FLAGS

   1  " "                                                                     01630013   *
   1  "<13 <SUBHDG4"                                                          01640031   *
   1  "<13 <SUBHDG5"                                                          01650031   *
   1  PRINT L20 AS '' IN 1                                                    01660022   *
   1  OVER  L21 AS '' IN 1                                                    01670022   *
   1  BY STUDY_ID SUP-PRINT                                                   01680016   *
   1  BY SAMPLE_ID4 SUP-PRINT AND PAGE-BREAK                                  01690015   *
   1  BY RECTYPE SUP-PRINT AND SKIP-LINE                                      01700039   *
   1  END                                                                     01710013   *
```

PROCEDURES FOR DATA CONVERSION

The data collected will have to be made available to the CDC CYBER system. When the data is keyed, it is put on a tape in EBCDIC format which is compatible with the IBM system. This data must be converted to ASCII, a format compatible with the CYBER.

The tape of collected data can be accessed using a NUTP account on the CYBER. Define the tape as a stranger tape on the CYBER, and a FORM command will convert it to a disk file in ASCII format.

A listing of a command file which will convert the data is attached. The job listing from a test run is also included. You can create a command file from this listing and run it as a batch job for the conversion.

The tape of collected data has the following attributes:

Record Length:	364 characters
Block Size:	3640 (10 records per block)
Format:	EBCDIC, sequential, fixed block.

Note: Once the computer reports are run and the data collection tape converted, the tape must be returned to D.E. Systems. Simply sign the tape out at the Job Submission counter and send the tape back via courier.

```
++
100=IDBSE.CM60000,T100,P2,GE1.
110=ACCOUNT.41631.
120=REQUEST,TAPEIN,GE,S,VSN=DEL213,NORING.
130=REQUEST,FILEOUT,*PF.
140=FILE,TAPEIN,FO=SQ,BT=K,RT=F,FL=364,RB=10,BFS=525,CM=YES.
150=FILE,FILEOUT,FO=SQ,BT=C,RT=Z,MRL=364,BFS=525,CM=YES.
160=FORM.
170=EXIT,U.
180=CATCYC,FILEOUT,STUDY1DATA,ID=IDBSE,RP=999.
190=*EOR
200=INP(TAPEIN)
210=OUT(FILEOUT)
++


1=1NOBUL        UPDATED 10/04/84  TODAY IS 11/04/84
2=
3=
4=0   PLEASE SEE SYSBULL(BATCH) FOR '83-'84 CREDIT REQUESTS.
5=0 S.V.P. REGARDEZ SYSBULL(BATCH) CONCERNANT DES CREDITS DE '83-'84.
6=*EOR00
7=1
8=0INP(TAPEIN)
9=0OUT(FILEOUT)
10=0FATAL CRM ERROR
11=*EOR00
12=:
13=*EOR00
14=1  MFB  DSC CYBER 730 SN497 NOS/BE 1.4 L564 4073
15= 14.37.47.IDBSEKV  FROM MFA/DA
16= 14.37.47.IP  00000128 WORDS - FILE INPUT  . DC 04
17= 14.37.47.IDBSE,CM60000.T100,P2,GE1.
18= 14.37.48 SYSBULL(NOBUL)
19= 14.37.49.REQUEST,TAPEIN,GE,S,VSN=DEL213,NORING.
20= 14.39.50.(NT 063 ASSIGNED)
21= 14.39.50.REQUEST,FILEOUT,*PF.
22= 14.39.50.FILE,TAPEIN,FO=SQ,BT=K,RT=F,FL=364,RB=10
23= 14.39.50.,BFS=525,CM=YES.
24= 14.39.50.FILE,FILEOUT,FO=SQ,BT=C,RT=Z,MRL=364,BFS
25= 14.39.50.=525,CM=YES.
26= 14.39.50.FORM.
27= 14.39.53.NT63 VOLUME SERIAL NUMBER IS  DEL213
28= 14.39.53.( FILEOUT ASSIGNED TO EST 014)
29= 14.40.19.NT63 BLOCK COUNT=    005052
30= 14.40.19.READ PARITY ERROR IRRECOVERABLE
31= 14.40.19. CRM FATAL 0137 ON LFN TAPEIN
32= 14.40.19.(PA)= C000000000000000000
33= 14.40.20.EXIT,U.
34= 14.40.20.CATCYC,FILEOUT,STUDY1DATA,ID=IDBSE,RP=99
35= 14.40.20.9.
36= 14.40.20.FILE SIZE          230 PRUS
37= 14.40.26.INITIAL CATALOG
38= 14.40.26.CT ID=    IDBSE PFN=STUDY1DATA
39= 14.40.26.CT CY= 001 SN=PUBLIC2 0000014720 WORDS.
40= 14.40.26.OP  00000192 WORDS - FILE OUTPUT  , DC 40
41= 14.40.26.MAX STEP FL 003300B .MAX JOB FL 053000B
42= 14.40.26.CPA       4.584 SEC.  (        58 SEC.): $        .381
43= 14.40.26.IO       93.862 SEC.  (      1368 SEC.): $        .912
44= 14.40.26.CM     1334.242 KWS.  (     24668 KWS.): $        .370
45= 14.40.26.SS (P2 RATE/TAUX)                  TOTAL: $       1.665
46= 14.40.26.PP      101.152 SEC.     DATE 11/04/84
47= 14.40.26.EJ  END OF JOB, DA
```

CONSIDERATIONS FOR LOADING DATA ONTO THE CANUT DATA BASE

Data for the CANUT data base will come from many different sources. The format of the computerized data will vary with each source. All of this data will have to be converted to conform with the data base structure.

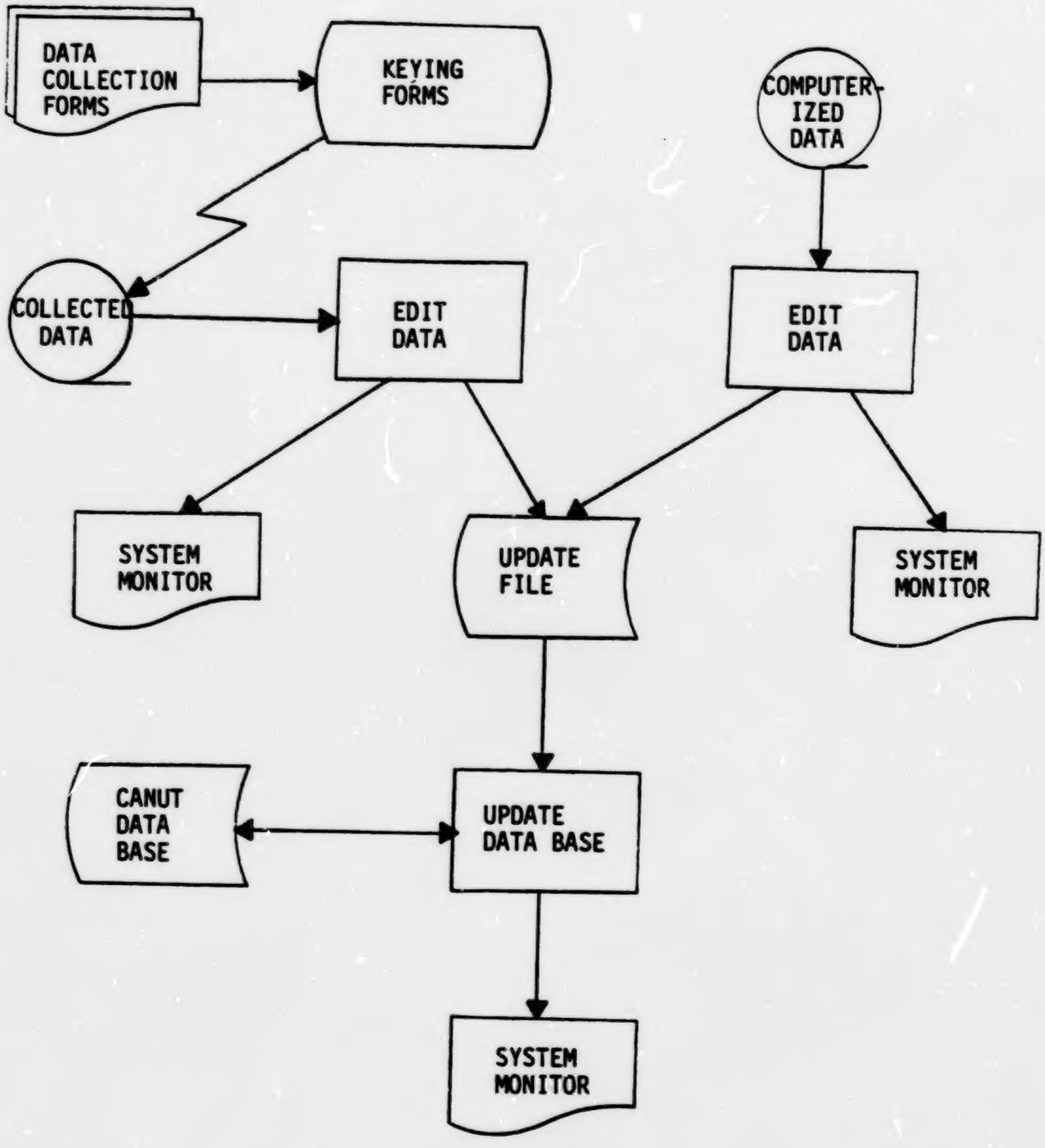
The best method of loading the various types of data would be to have a separate program for each type to convert and edit the data. Each of these programs would write to a common update file. This file would be in a format similar to the data base structure to make updates to the data base easier. The proposed system is outlined on the next page.

DETAILS ON THE DATA COLLECTED FROM HARD COPY REPORTS

Consider these points when you convert the data collected for the CANUT data base:

- the study author is contained in the first 40 characters of Study Title;
- Reference Identifier is composed of Sample Type, Source Code, and a tailing site number with a location sequence number;
- Qualifier is keyed as an alphanumeric field and will be left justified;
- there will be more than one sample record in cases where the sample description is longer than 35 characters;
- there will only be one sample record per borehole. Each depth interval in the borehole measurements is a sample.

PROPOSED SYSTEM TO LOAD DATA ONTO THE CANUT DATA BASE


DATA COLLECTION FORMS
KEYING FORMS
COMPUTERIZED DATA
COLLECTED DATA
EDIT DATA
EDIT DATA
SYSTEM MONITOR
UPDATE FILE
SYSTEM MONITOR
CANUT DATA BASE
UPDATE DATA BASE
SYSTEM MONITOR